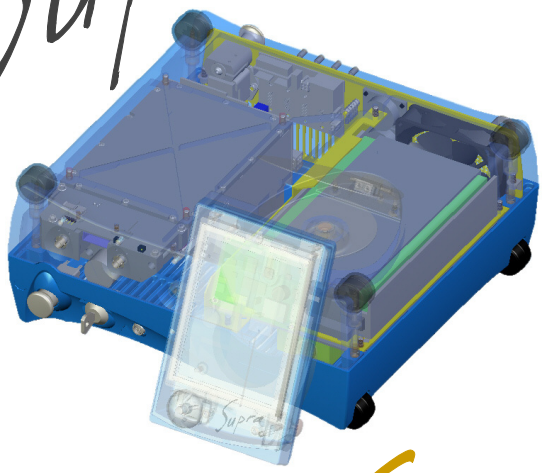
Quantel medical

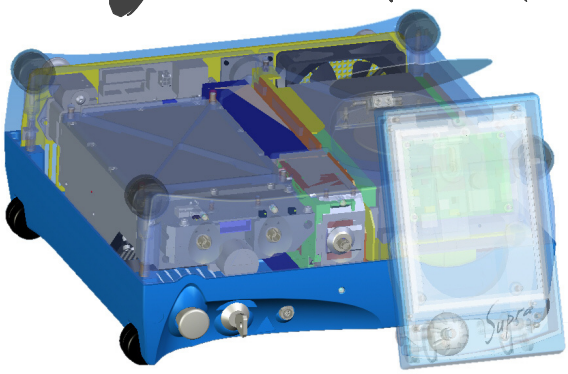
OPHTHALMIC PHOTOCOAGULATORS

Supra



532NM

Supra Twin



660 AND 810 NM

Supra 577·Y

577NM

SERVICE MANUAL

CE 0459

Directive 93/42/EEC

XL SUP MT AN

JUNE 2010

QUANTEL MEDICAL

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WARNINGS

WARRANTY: - Any adjusting and calibrating procedure described in this manual shall be performed only by technicians previously trained by QUANTEL MEDICAL.

- Any faulty part will be replaced by a strictly identical one provided by QUANTEL MEDICAL.

- For safety reasons, QUANTEL MEDICAL considers any laser module and electronic board as whole partial assembly:

  * Defective boards will be returned to QUANTEL MEDICAL for replacement.
  * Warranty will not be applied if a board has been damaged during an intervention or attempt to repair.

* The laser partial assemblies are:

"POWER SUPPLY block",		**"CPU Board",**
"POWER Board",		**"OPTION POWER Board",**
"I/O board" ,		
"532 nm CAVITY block",		**"INJECTION Board".**
"810 nm CAVITY block",	**or**	**"660 nm CAVITY block"**
"577 nm CAVITY block",		**"577 nm INTERFACE board".**

Warranty will not be applied unless these recommendations are strictly respected.

WARRANTY VOID
IF THE CAVITY IS OPENED

CAUTIONS: All technicians will carefully respect all the safety instructions described in this service manual.

WARNING: Special training by QUANTEL MEDICAL for technicians is necessary to ensure optimum adjustment and maximum reliability of the whole instrument.

LASER SAFETIES:

All staff using this laser system, or in charge of its maintenance, must be aware of the following basic precautions to be taken:

1- Never look straight to the beam or to any reflecting object able to reflect the beam.

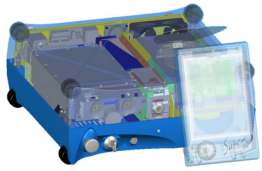
2- Limit the laser room access to the requested personnel only, who is already aware of precautions to be taken.

3- The laser room must be indicated with the specially designed labels.

4- Never direct the laser beam towards an aperture.

5- Never expose any reflective object or shiny surface to the direct beam path.

IMPORTANT: After each use, switch off the instrument completly by turning the key to 'OFF' position.



WARNINGS

The system is intended for continuous operation and has the following classification:

- Protective class: **I** *(Main insulation)*
- Type: **BF** *(Protection against electrical schocks)*
- Protection degree: **IP20** *(Protection from solid substances Ø>12,5mm)*
- Operation: **Continuous with short-time loading**

WARNINGS: **HAZARD VOLTAGE PRESENCE INSIDE THE UNIT**

- Laser power could be accessible upon removal of console cover:

TREATMENT BEAM		AIMING BEAM	
WAVELENGTH	**POWER**	**WAVELENGTH**	**POWER**
532 nm	up to 3,5 W		
577 nm	up to 2,2 W		
660 nm	up to 1,2 W	635 nm	up to 1,2mW
810 nm	up to 4 W		

DO NOT remove cover unless instructed to do so by a factory-trained technician.

- Anyone in room during service or maintenance shall wear **protective safety goggles.**

IMPORTANT: **check carefully these protective glasses are adequate for the wavelength used.**

For the SUPRA range:

Protection **OD4** at **532 nm**: Reference (EN207): **D 180-532 L4**.
Protection **OD4** at **577 nm**: Reference (EN207): **D 570-620 L4**.
Protection **OD4** at **660 nm**: Reference (EN207): **DIR 664 L4**.
Protection **OD4** at **810 nm**: Reference (EN207): **D 790-910 L4**.

CAUTION: **Use of controls or adjustments or performances other than those specified herein may result in hazardous radiation exposure.**

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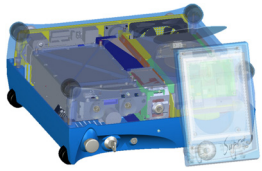

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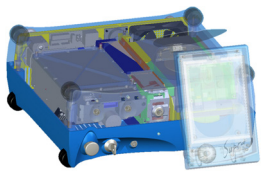
TECHNICAL SPECIFICATIONS



1-1 COMMON SPECIFICATIONS

PARAMETER		DESCRIPTION
TREATMENT BEAM		
	Exposure time	**SINGLE - REPEAT** 0,01s to 60s
		PAINTING 0,05s
		µPULSES 0,1ms to 1ms (duty cycle: 9% to 15%)
	Shot interval	**REPEAT** 0,1 - 0,15 - 0,2 - 0,3 - 0,4 - 0,5 - 0,6 - 0,7 - 1s
		PAINTING 0,02s
		µPULSES 1ms to 10ms (duty cycle: 9% to 15%)
	Shot counter	Shot number delivered (0 to 9999)
AIMING BEAM		
	Laser class	Class 2 laser product.
	Laser source	Laser diode 635nm.
	Output power	< 1,0 mW (out of optical delivery).
CONTROL INTERFACE		
	Key switch	Power supply ON / OFF.
	Front panel	illuminated push button touch screen. 8,8 cm x 11,7 cm (3,47 in X 4,61 in).
	Foot switch	Connected at the back of the unit, redundant switch configuration.
	Emergency stop	Cuts power to all user interface controls, disables laser head.
	Safety	Internal safety monitoring of all critical systems including redundant safety circuits to monitor shutter system, power control system and microprocessor control system.

DIMENSIONS & WEIGHTS

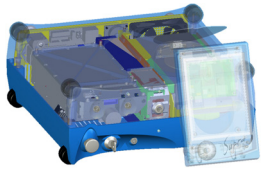
	LASER CONSOLE	CONTROL BOX	FOOTSWITCH
Height:	14,6 cm (5,8 in)	19,3 cm (7,6 in)	16,5 cm (6,5 in)
Width:	33 cm (13 in)	12,6 cm (5 in)	17,5 cm (6,9 in)
Depth:	30,7 cm (12,1 in)	8,7 cm (6,3 in)	34 cm (13,4 in)
Weight:			
SUPRA	9 Kg (19,7 lb)		
SUPRA TWIN	9,95 kg (21,4 lb)		
SUPRA 810	9,2 kg (20,3lb)	1,2 Kg (2,7 lb)	2,7 Kg (6 lb)
SUPRA 577·Y	9,3 kg (20,5 lb)		

1-2 532nm LASER

PARAMETER	DESCRIPTION
TREATMENT BEAM	
Laser class	Class 4 laser product.
Laser source	Frequency doubled Nd : YAG. Pumping system by laser diode.
Wavelength	532 nanometers (nm).
Fiber output	2 output ports.
Output power 1 Output power 2	30 - 3000 milliWatts (out of optical delivery). 30 - 3000 milliWatts (out of optical delivery).
Power supply	100-240 Vac, < 6,5A, 50/60 Hz, single phase.
Cooling	Solid state cooling with thermoelectric (Peltier) heat pump.
CONTROL INTERFACE	
Optical delivery	Endoprobes. Slit lamp adaptor. Indirect ophthalmoscope adaptor. Microscope adaptor. Photon

1- 3 577nm LASER

PARAMETER	DESCRIPTION
TREATMENT BEAM	
Laser class	Class 4 laser product.
Laser source	OPSL cavity Pumping system by laser diode.
Wavelength	577 ±3 nanometers (nm).
Fiber output	1 output port.
Output power	50 - 2000 milliWatts (out of optical delivery).
Power supply	100-240 Vac, < 6,3A, 50/60 Hz, single phase.
Cooling	Solid state cooling with thermoelectric (Peltier) heat pump.
CONTROL INTERFACE	
Optical delivery	Endoprobes. Slit lamp adaptor. Indirect ophthalmoscope adaptor. Microscope adaptor. Photon



1- 4 660nm LASER

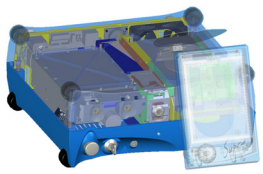
PARAMETER	DESCRIPTION
TREATMENT BEAM	
Laser class	Class 4 laser product.
Laser source	Laser diode.
Wavelength	660 nanometers (nm).
Fiber output	1 output port.
Output power	30 - 700 milliWatts (out of optical delivery).
Power supply	100-240 Vac, < 6,5A, 50/60 Hz, single phase.
Cooling	Air cooling.
CONTROL INTERFACE	
Optical delivery	Pan-Retinal Photocoagulation adaptor (P.R.P. adaptor).

1- 5 810nm LASER

PARAMETER	DESCRIPTION
TREATMENT BEAM	
Laser class	Class 4 laser product.
Laser source	Laser diode.
Wavelength	810 nanometers (nm).
Fiber output	1 output port.
Output power	30 - 3000 milliWatts (out of optical delivery).
Power supply	100-240 Vac, < 6,5A, 50/60 Hz, single phase.
Cooling	Air cooling.
CONTROL INTERFACE	
Optical delivery	Endoprobes. Cyclo-photocoagulation probes. Indirect ophthalmoscope adaptor. Microscope adaptor. Pan-Retinal Photocoagulation adaptor (P.R.P. adaptor). Transpupillary ThermoThérapy adaptor (T.T.T. adaptor) Photon

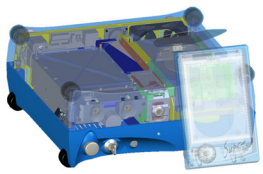
1-6 COMPLIANCE

- This device complies with:	**21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated July 26, 2001.**
- European Directive:	**93/42/EEC**
- Medical electrical equipment - Part 1 : General requirements for safety:	**IEC 60 601-1 : 1988 +A1 : 1991 +A2 : 1995**
- Electromagnetic compatibility:	**IEC 60 601-1-2 : 2001**
- Safety of therapeutic laser equipments:	**IEC 60 601-2-22 : 2007 ed 3.0**
- Safety of laser products:	**IEC 60 825-1 : 2007 ed 2.0**
- Programmable electrical medical systems	**IEC 60 601-1-4 : 2000 ed 1.1**
- Footswitch complies:	**IPX8**
- Housing material comply with:	**UL 94V0**
- Electronic boards complies with: (marked on the boards)	**UL 94V0**



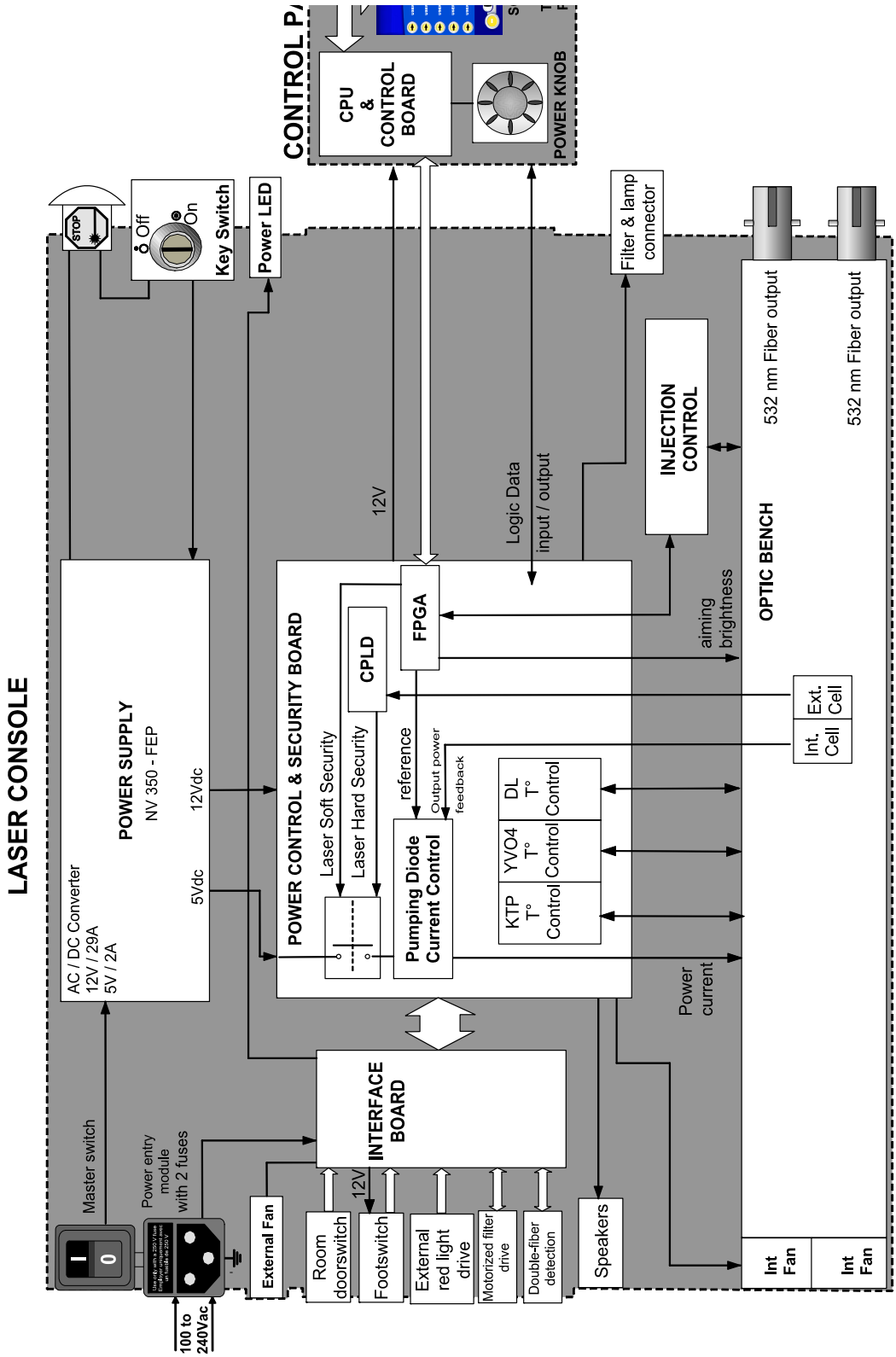
2

BLOCK AND WIRING DIAGRAMS

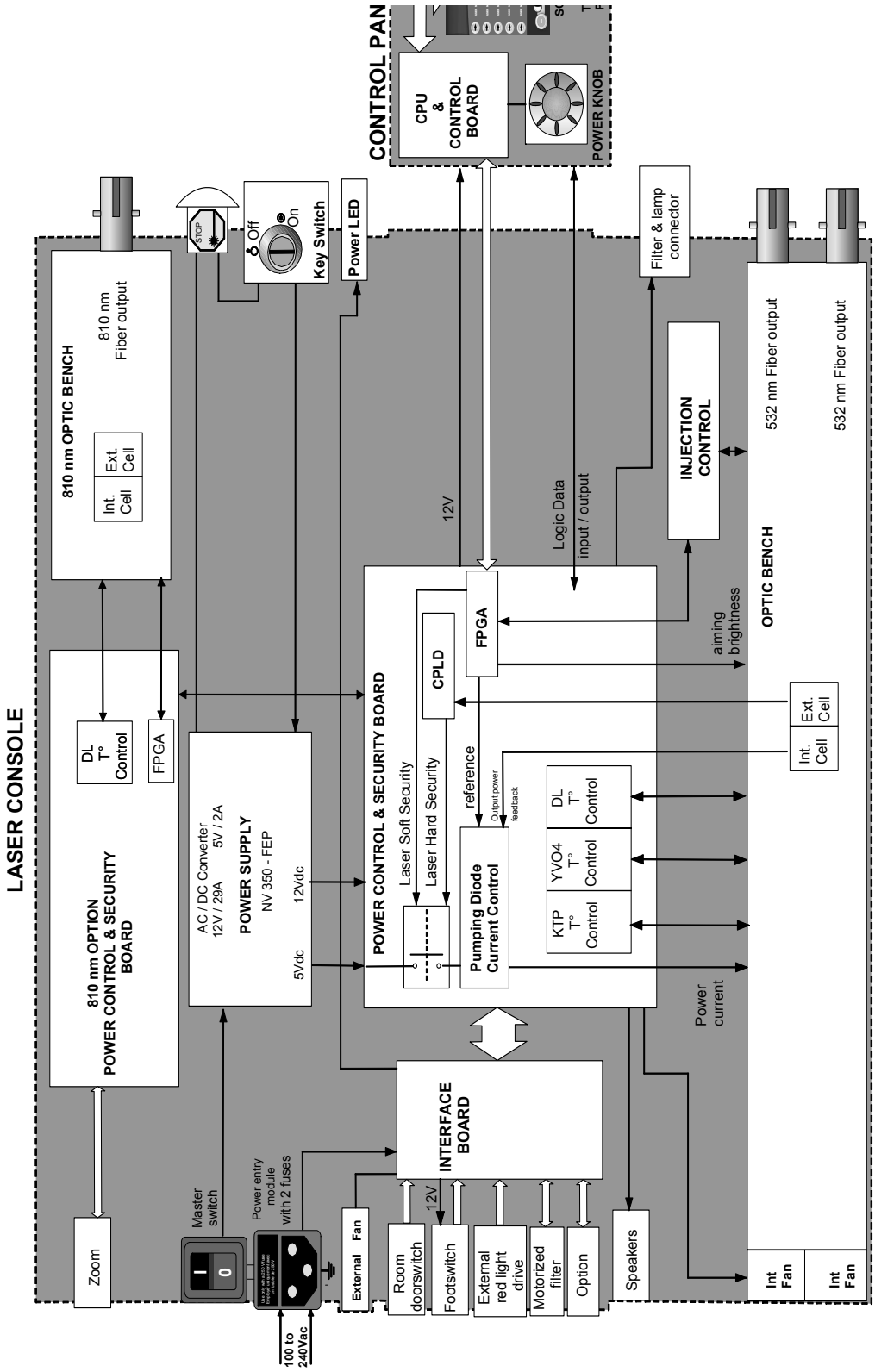


2 BLOCK AND WIRING DIAGRAMS

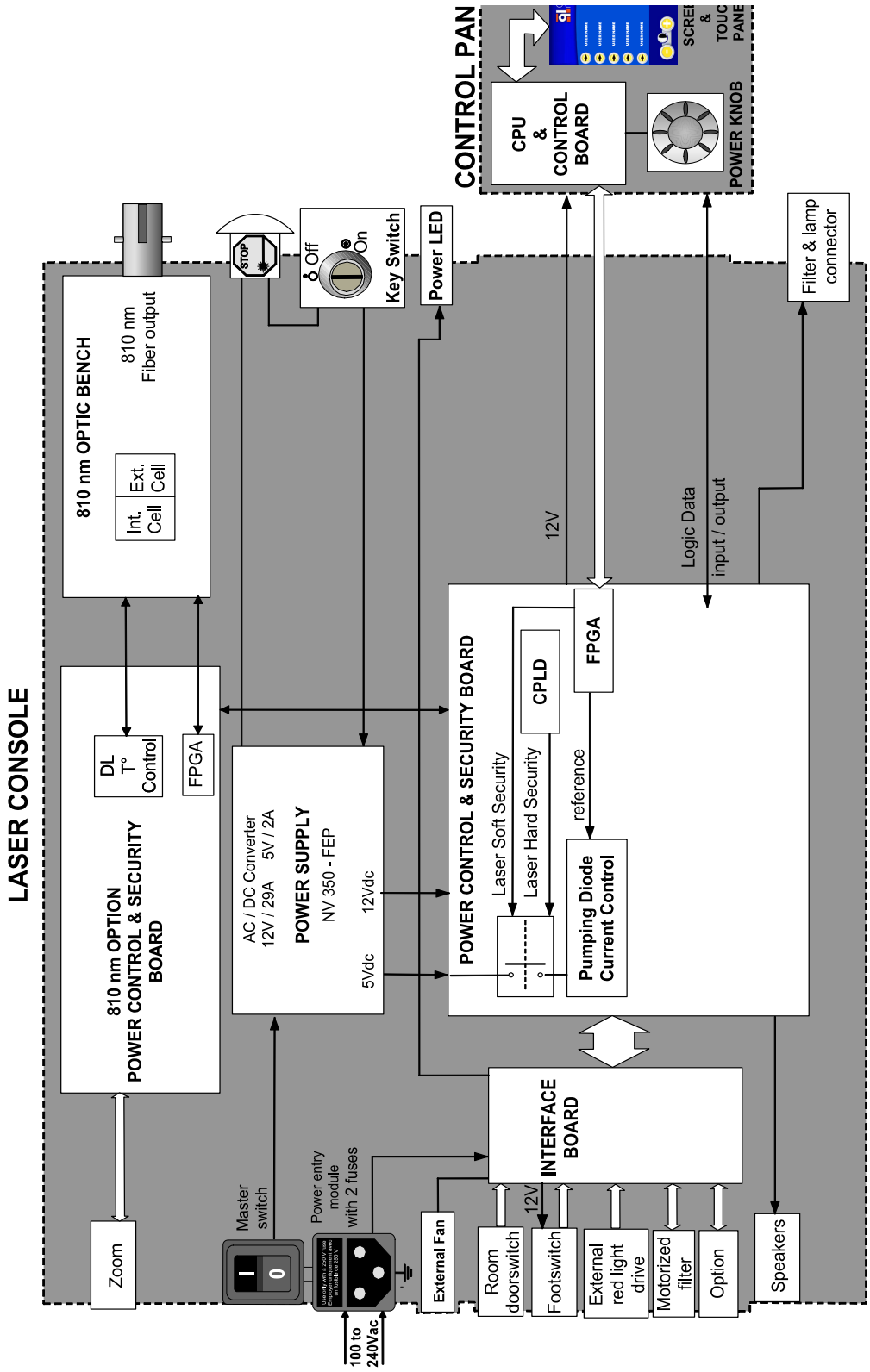
2-1 SUPRA



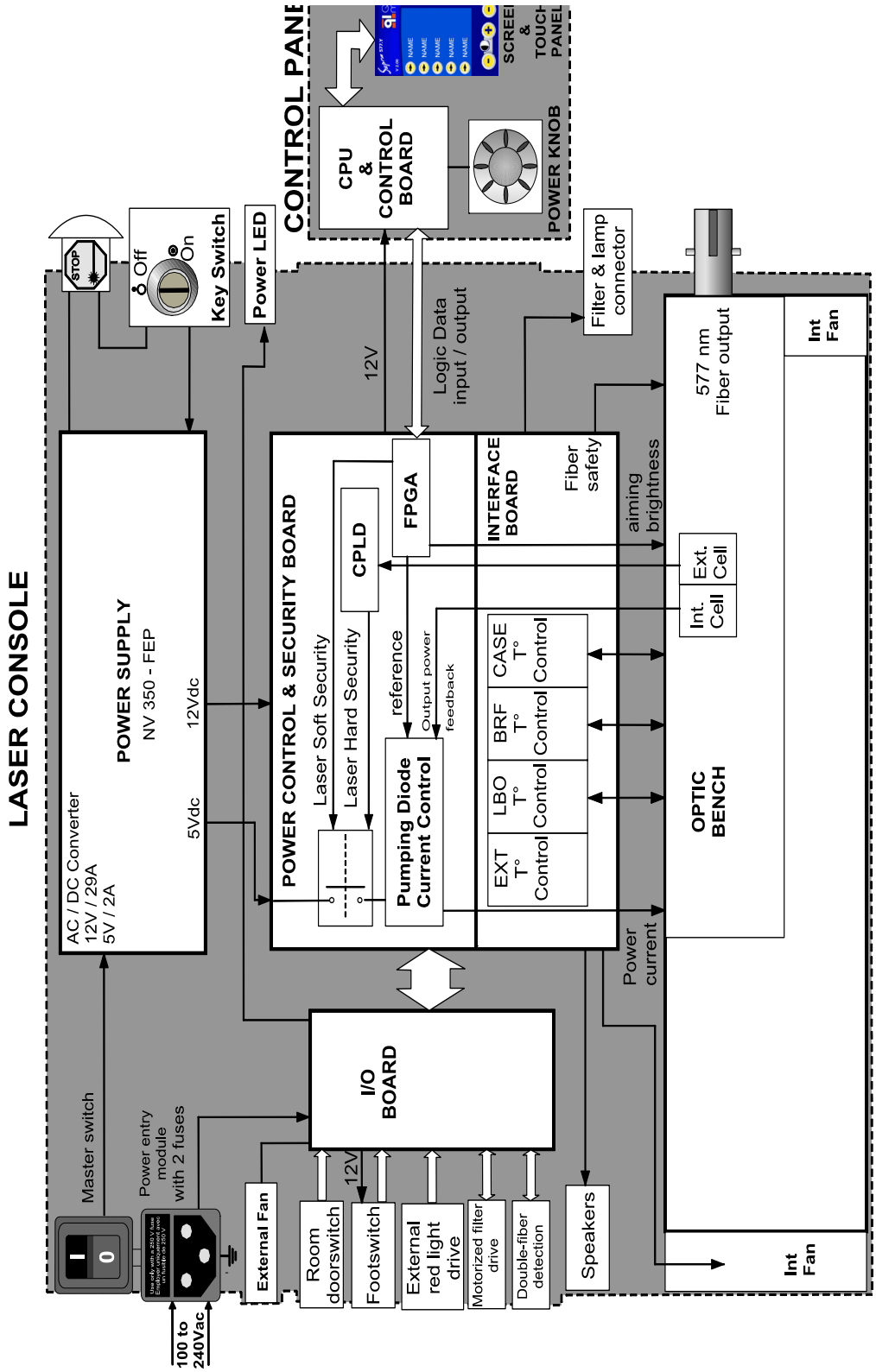
2-2 SUPRA TWIN

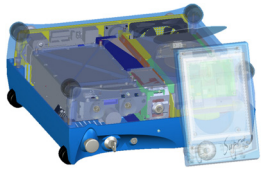


2-3 SUPRA 810


LASER CONSOLE
CONTROL PAN
SCREEN & TOUCH PANEL
CPU & CONTROL BOARD
POWER KNOB
Filter & lamp connector
STOP
Off
On
Key Switch
Power LED
810 nm OPTIC BENCH
810 nm Fiber output
Int. Cell
Ext. Cell
12V
Logic Data input / output
DL T° Control
FPGA
810 nm OPTION POWER CONTROL & SECURITY BOARD
AC / DC Converter 12V / 29A 5V / 2A
POWER SUPPLY NV 350 - FEP
12Vdc
5Vdc
POWER CONTROL & SECURITY BOARD
CPLD
FPGA
Laser Soft Security
Laser Hard Security
reference
Pumping Diode Current Control
INTERFACE BOARD
Zoom
Master switch
Power entry module with 2 fuses
100 to 240Vac
External Fan
Room doorswitch
12V
Footswitch
External red light drive
Motorized filter
Option
Speakers

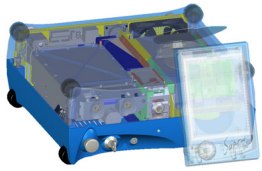
2-4 SUPRA 577·Y





3

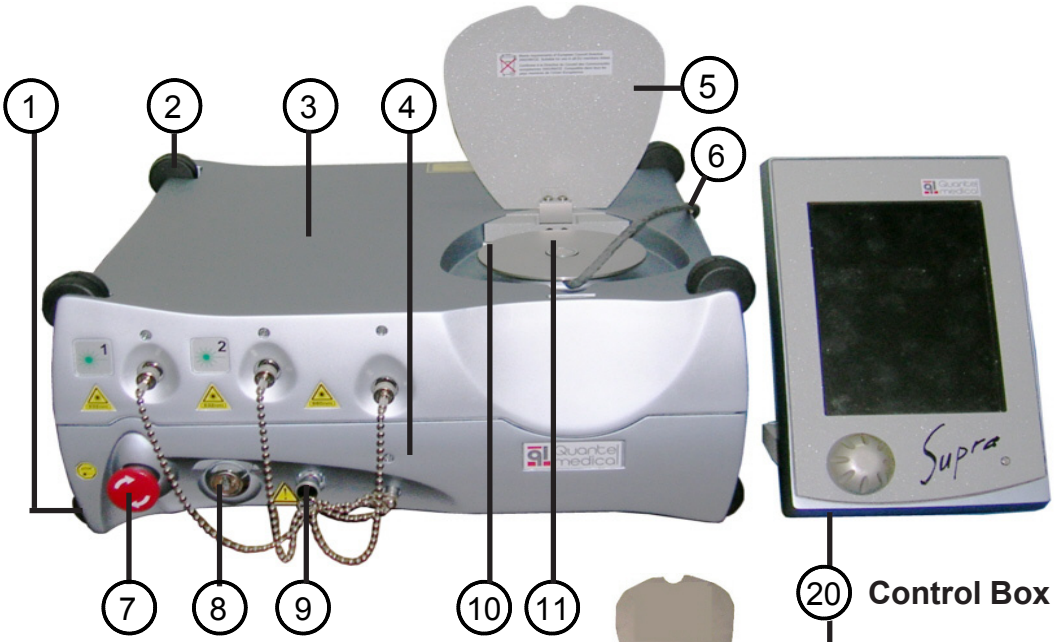
ACCESSORIES AND SPARE PARTS



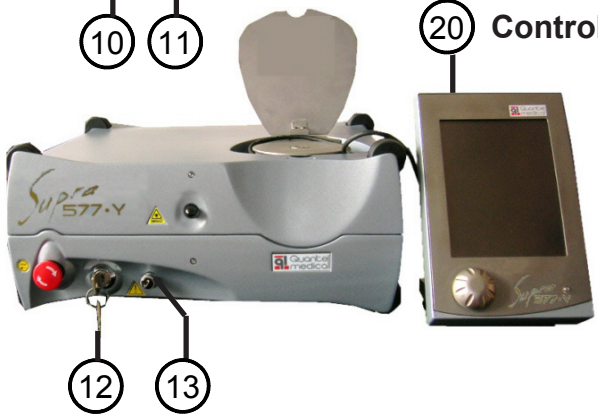
3 ACCESSORIES AND SPARE PARTS

3-1 OVERALL VIEWS

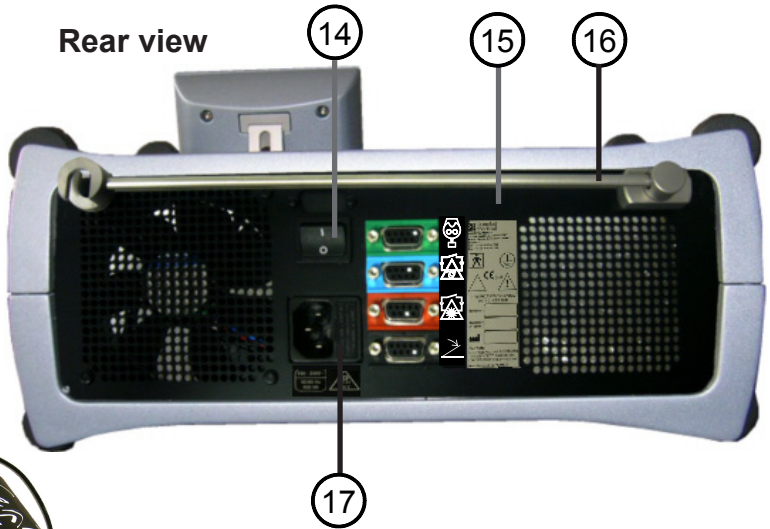
Front view



SUPRA 577.Y front view



Rear view



3-2 CONTROL BOX VIEWS

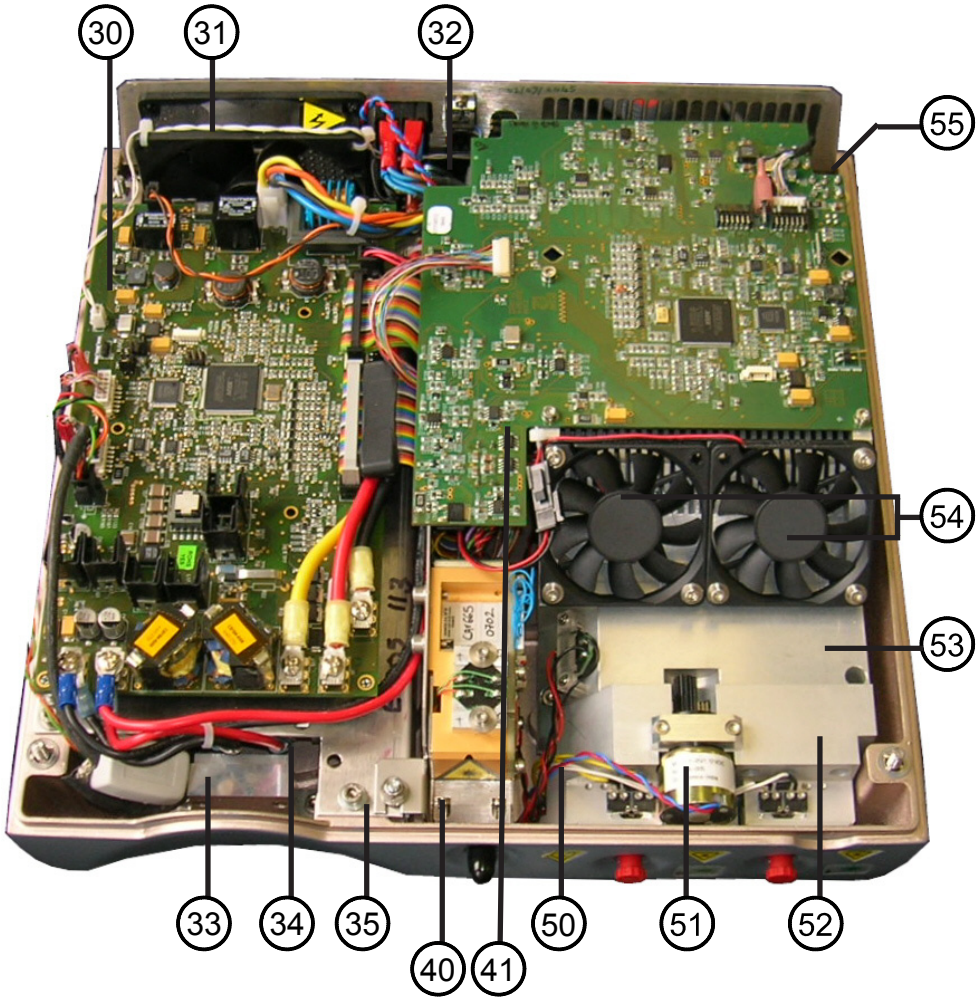
Front view

Rear view

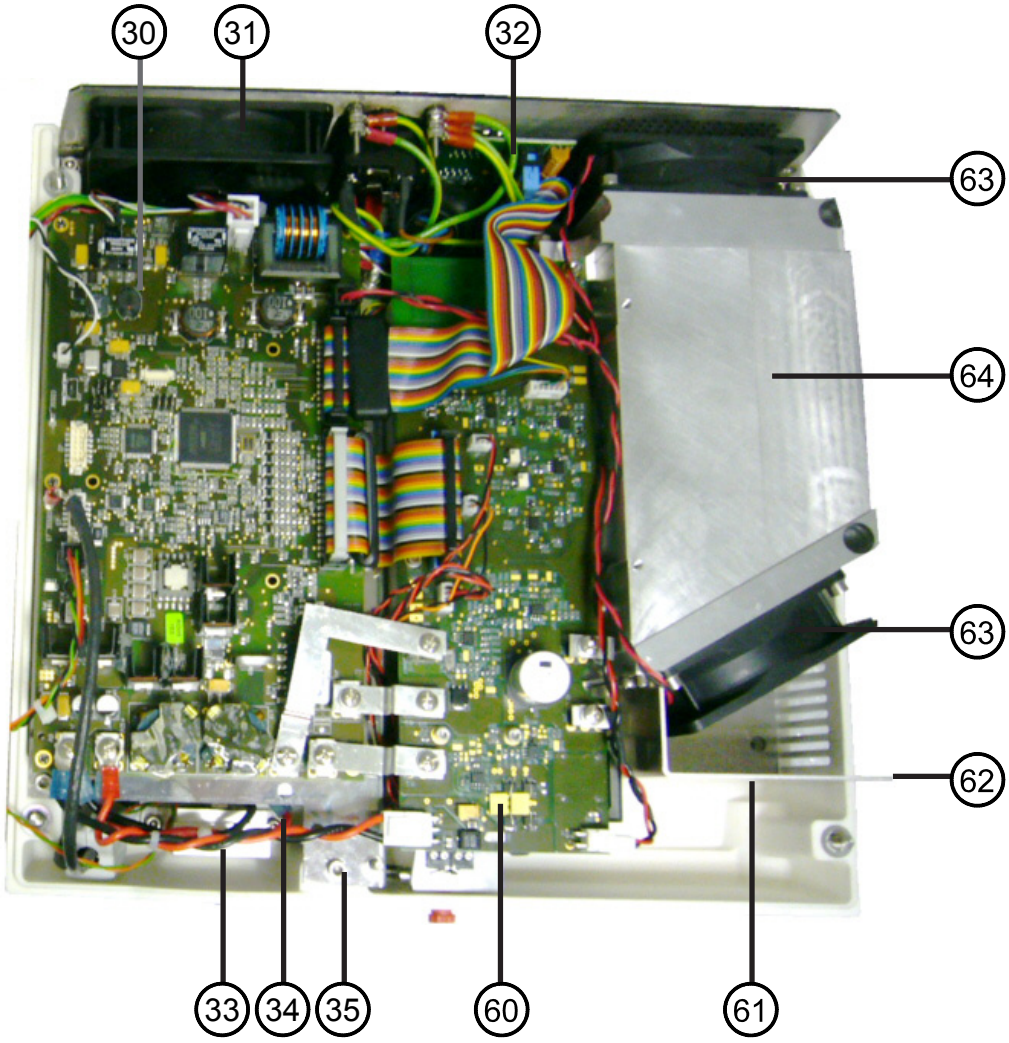
Inner view

3-3 INNER VIEWS

3-3-1 SUPRA & SUPRA TWIN INNER VIEW

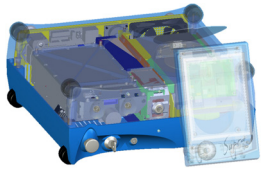


3-3-2 SUPRA 577 Y INNER VIEW



3-4 SUPRA FAMILY CODES

Marker	Idendification	SUPRA	SUPRA TWIN	SUPRA 810	SUPRA 577.Y
1	Bottom rubber foot (x4)				
2	Upper rubber foot (x4)				
3	Upper cover	XLSUPCAPOT			
4	Down cover				
5	Trap door				
6	Link cable				
7	Emergency stop button				
8	keyswitch				
9	Front filter & lamp connector				
10	Cable hanging plate				
11	Magnet				
12	Keys (x2)				
13	Front filter & lamp socket				
14	Master switch				
15	Metalic rear panel				
16	Antenna	XLSUPANTENNE			
17	Power entry module				
18	Footswitch "Gentlefoot"				
Marker	**Idendification**	**SUPRA**	**SUPRA TWIN**	**SUPRA 810**	**SUPRA 577.Y**
20	Control box	XLSUPBOITIER			
21	Power button				
22	Screen				
23	Screen front face	XLSUPFAVBOIT			
24	Screen cover (front and back)	XLSUPHABBOIT			
25	Control box insert finger				
26	Control box foot				
27	Screen block				
28	CPU board	XLCARTBOIT			
Marker	**Idendification**	**SUPRA**	**SUPRA TWIN**	**SUPRA 810**	**SUPRA 577.Y**
30	Power board	XLSUPPCB			
31	External fan	XLSUPVENTAR			
32	I/O board				
33	Control box Inserting housing				
34	Power supply block	XLSUPALIM			
35	Power supply chassis				
Marker	**Idendification**	**SUPRA**	**SUPRA TWIN**	**SUPRA 810**	**SUPRA 577.Y**
40 + 41	810nm cavity + option board				
	660nm cavity + option board				
Marker	**Idendification**	**SUPRA**	**SUPRA TWIN**	**SUPRA 810**	**SUPRA 577.Y**
50	532nm injection board	XLSUPCARTINJ			
51	532nm injection motor	XLSUPMOTEUR			
52	532nm injection block				
53	532nm cavity	XLSUPCAV532			
54	532nm cavity fans	XLSUPVENTCAV			
55	532nm cavity board	XLSUPCARTCAV			
Marker	**Idendification**	**SUPRA**	**SUPRA TWIN**	**SUPRA 810**	**SUPRA 577.Y**
60	577nm interface board				
61	Jumper				
62	577nm cavity chassis				
63	577nm cavity fans				
64	577nm cavity				



4

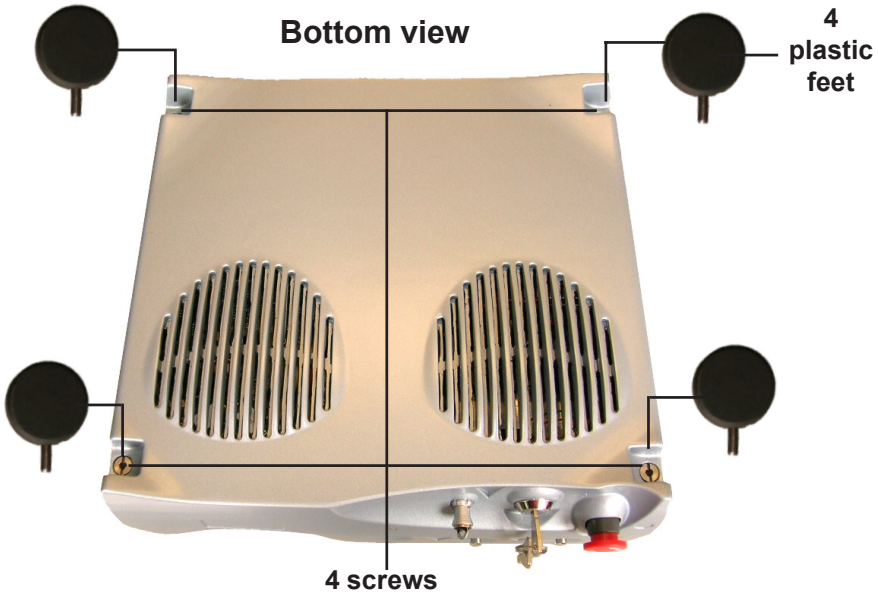
DISASSEMBLING

4-1 COVER REMOVAL

BEFORE ANY INTERVENTION on the LASER,
unplug the mains cord at its back. Remove all cables and connectors.

4-1-1 LASER CONSOLE COVER

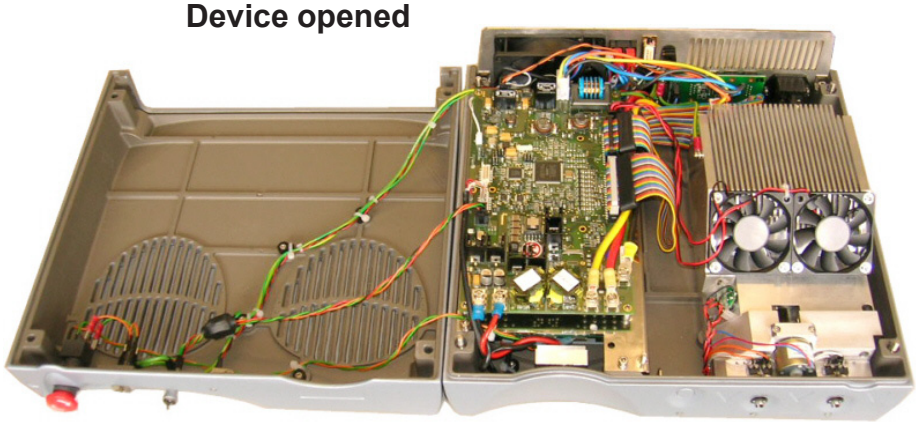
- Return the laser console on its upper cover.
- Pull out the 4 black rubber feet.
- Unscrew the 4 screws under these feet.



CAUTION: **The cover is linked with cables to the chassis. The length of these cables do not allow a large moving of the cover. Do not bend to much these cables to avoid any connection trouble.**

- Remove with care the cover, by pulling it.
- Put the cover on a soft material to protect the cover paint.
- Proceed reverse to re-mount the cover.

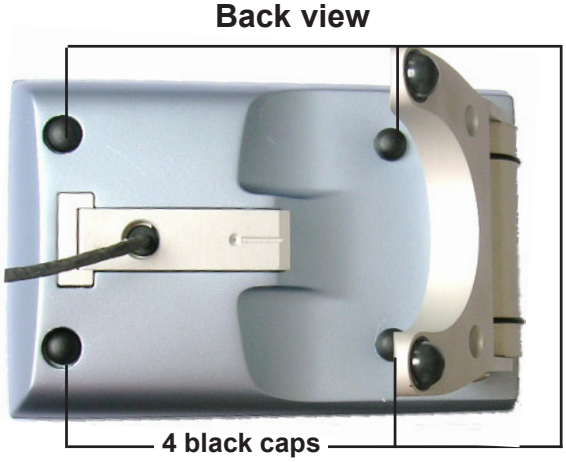
Device opened



4-1-2 CONTROL BOX COVER

- Put the control box on its front face on a soft material.

Back view



- Perform a slit into the 4 black plastic caps with a cutter.

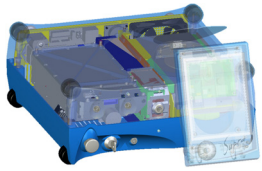
- Introduce a screw driver into a slit.
- Unscrew the 4 screws.

- The 4 black caps must be replace by new ones when the control box is re-assembly.

CAUTION: **The cover is linked with cables to the chassis. The length of these cables do not allow a large moving of the cover. Do not bend to much these cables to avoid any connection trouble.**

- Remove with care the cover, by pulling it.
- Put the cover on a soft material to protect the cover paint.

Inner view



4-2 DEVICE SUBSYSTEM

SUPRA family lasers are composed with electronic boards, electrical systems and optical blocks:

Electronic boards:

- I/O board
- Power board
- CPU board
- Power Supply Block
- Screen block
- Injection board
- Cavity board
- Option power board
- Option cavity board
- 577nm Interface board

Optical block: (never have to be opened)

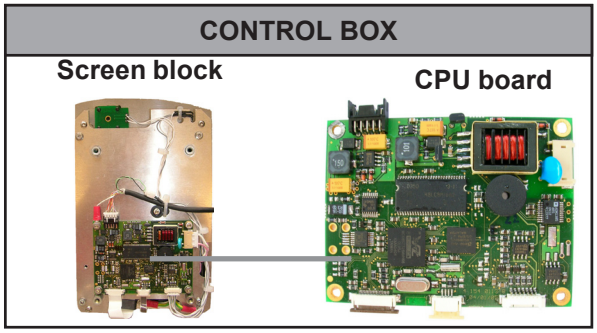
- 532nm Cavity
- 660nm Cavity
- 577nm Cavity
- 810nm Cavity

Electrical system:

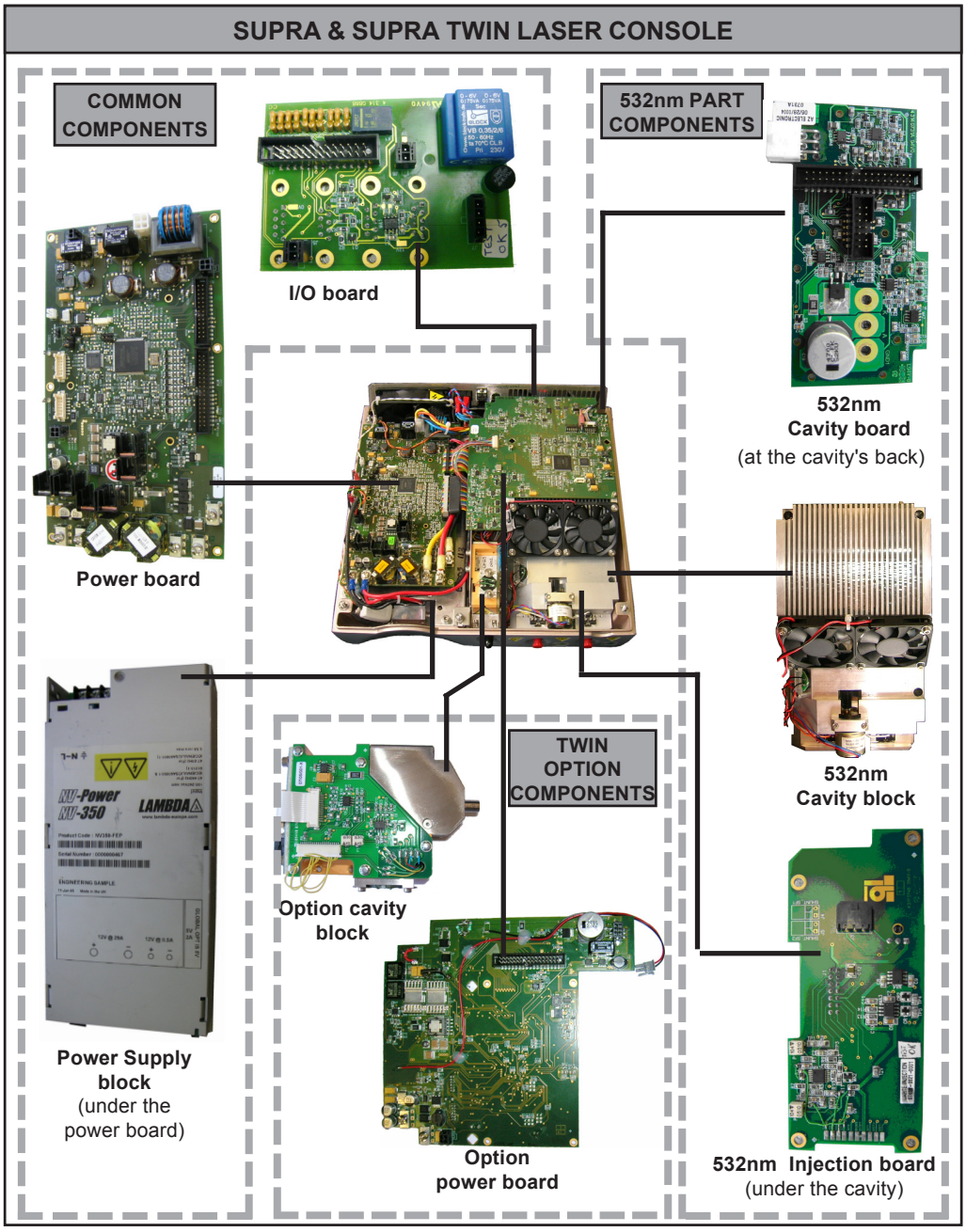
- Fans
- Power entry module
- Master switch

OPTICAL AND ELECTRONIC COMPONENTS					
COMPONENT	**SUPRA**	**SUPRA TWIN**		**SUPRA**	**SUPRA**
		660	**810**	**810**	**577·Y**
POWER board	X	X	X	X	X
I/O board	X	X	X	X	X
CPU board	X	X	X	X	X
POWER SUPPLY	X	X	X	X	X
532nm INJECTION board	X	X	X		
532nm CAVITY board	X	X	X		
532nm CAVITY	X	X	X		
OPTION POWER board		X	X	X	
660nm CAVITY		X			
810nm CAVITY			X	X	
577nm INTERFACE board					X
577nm CAVITY					X

4-2-1 CONTROL BOX SUBSYSTEM LOCATION

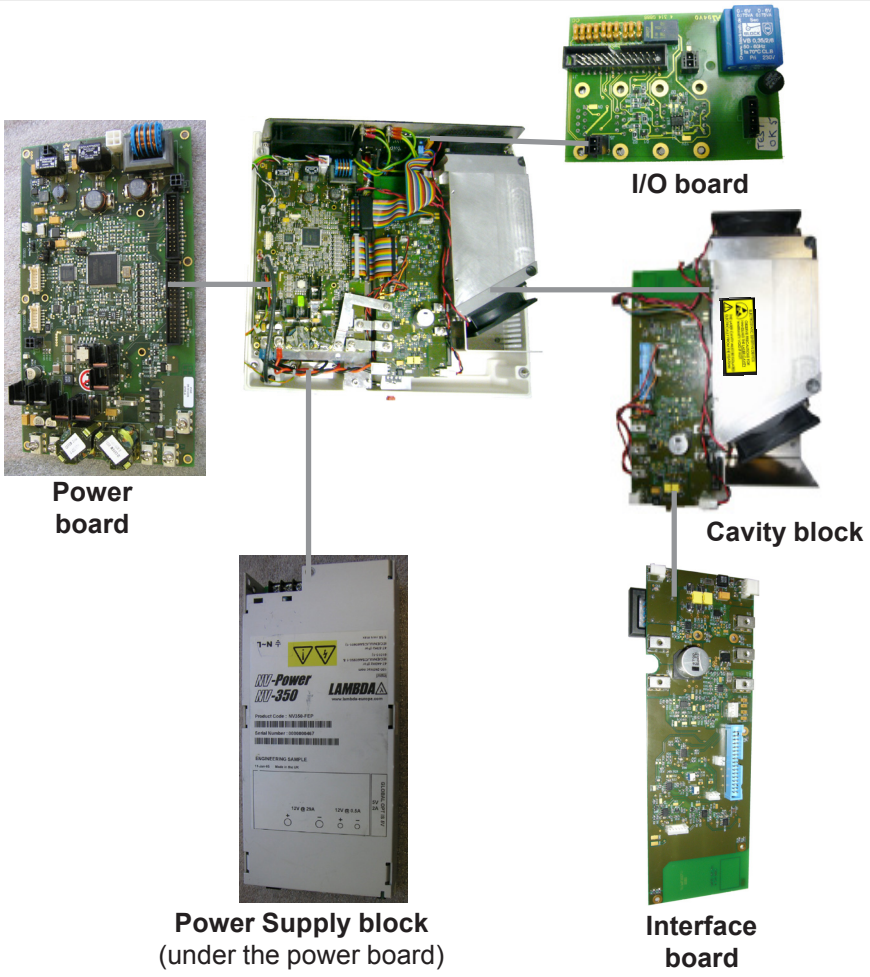


4-2-2 SUPRA & SUPRA TWIN SUBSYSTEM LOCATION



4-2-3 SUPRA 577·Y SUBSYSTEM LOCATION

SUPRA 577·Y LASER CONSOLE

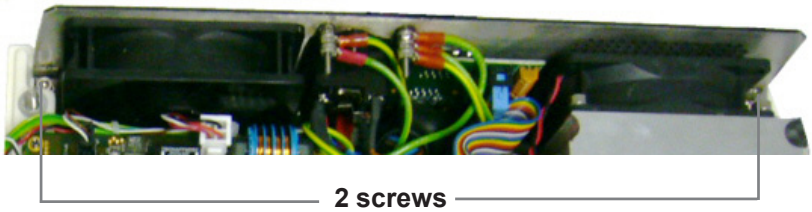


4-3 COMMON SUBSYSTEM DISASSEMBLING

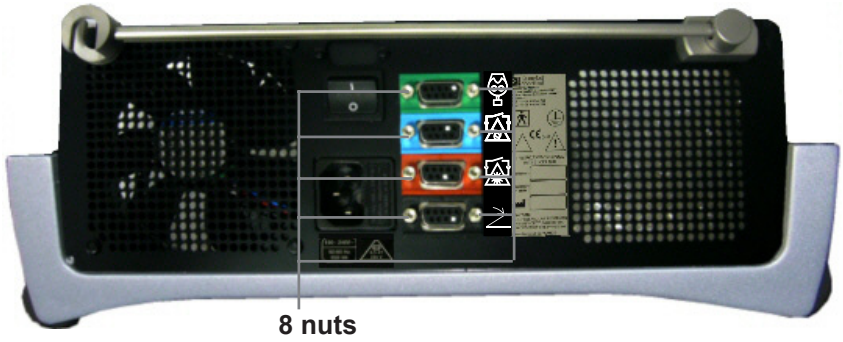
IT IS RECOMMANDED TO USE A MAGNETIC SCREWDRIVER FOR THE INTERNAL DISASSEMBLING.

4-3-1 I/O BOARD

Unplug the flat cable from the power board.
- Unscrew the 2 screws of the metalic rear panel.



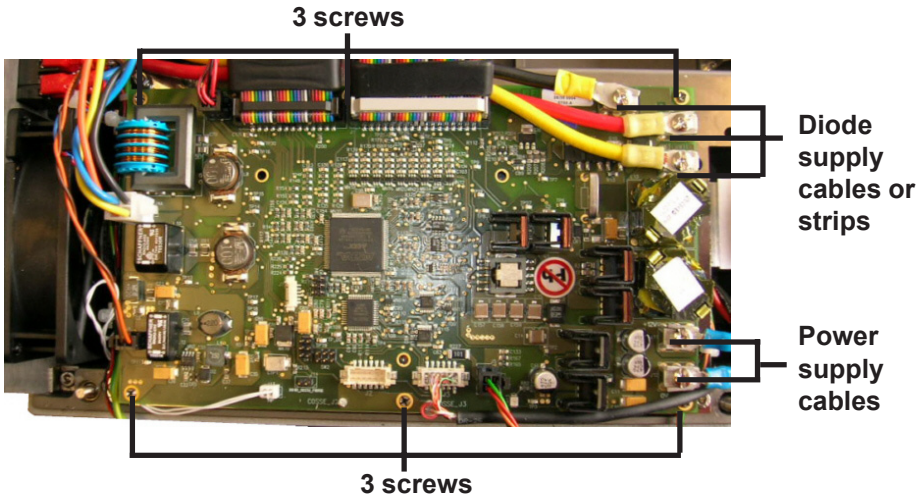
- Pull over the rear panel.
- Unscrew the 8 connector nuts at the rear panel.



- Unplug the 3 connectors on the board.

4-3-2 POWER BOARD

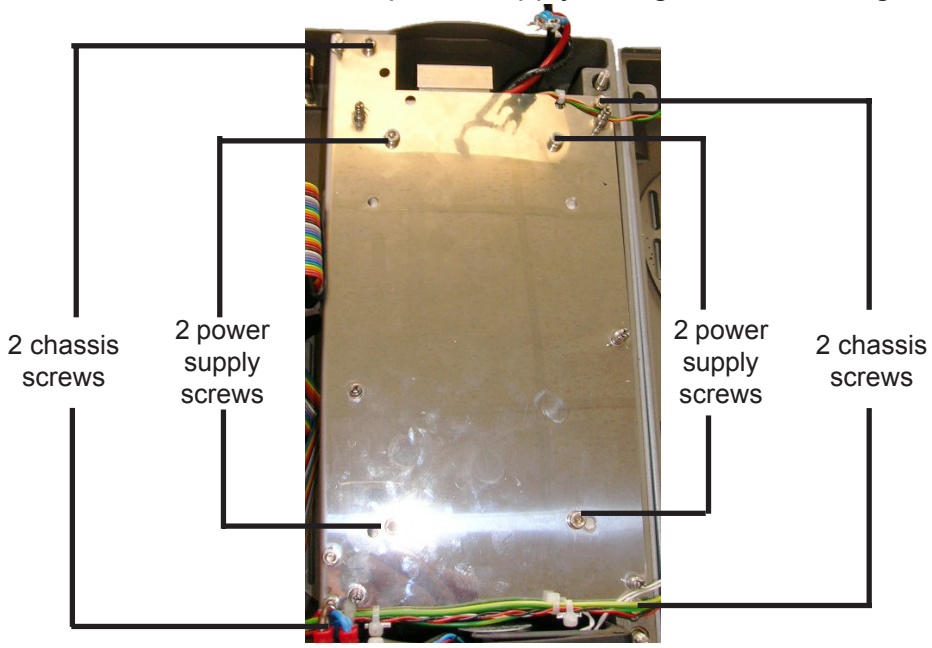
- Unplug all cables and wirings.
- Unscrew the 3 screws of the diode supply cables (or strips for SUPRA 577.Y) and the 2 screws of the power supply cables.
- Unscrew the 6 screws on board sides.



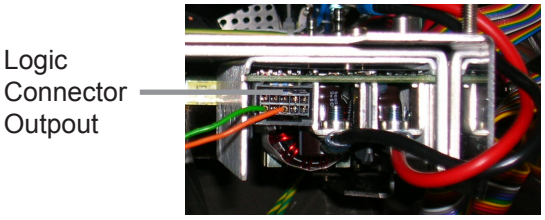
4-3-3 POWER SUPPLY BLOCK

The power supply is situated under the power board and the power supply chassis.
To access to it, it is necessary to remove the power board (see § 4-3-2) and the rear panel (see § 4-3-1).

- Unscrew the 4 screws of the power suply chassis taking care to the rings.
- Unscrew the 4 screws of the power supply taking care to the rings.



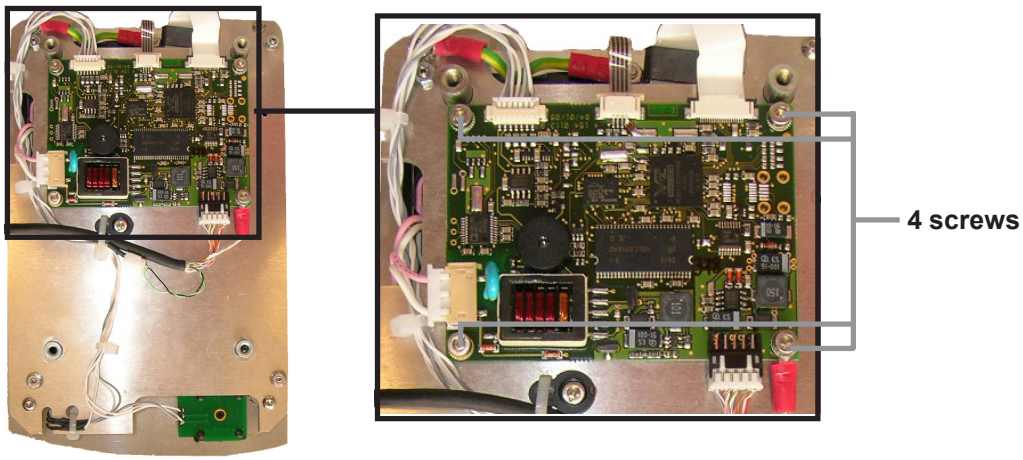
- Unplug the Logic Connector Outpout cable taking care where it is plug and its way.



- Unplug the 220Vac input connector.

4-3-4 CPU BOARD

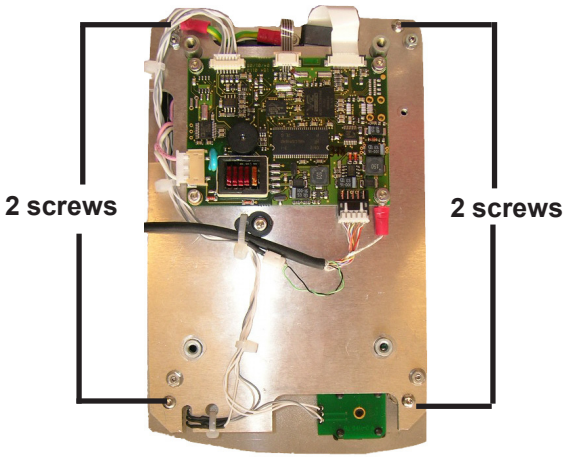
It is situated into the control box. To access to the CPU board, open the control box (see § 4-1-2).
- Unplug all cables and wirings.
- Unscrew the 4 screws.



4-3-5 TOUCH SCREEN BLOCK DISASSEMBLING

WARNING: **The touch screen is very fragile and the replacement of any components must be done following the procedure below. Perform it in comfortable space with care to avoid any damage.**

- Unplug all cables.
- Unscrew the ground cable.
- Remove the chassis taking care to the state led and the power button cable.

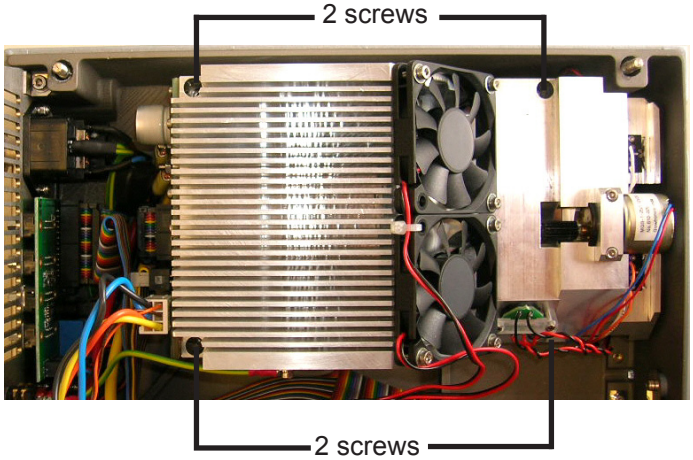


4-4 532nm SUBSYSTEM DISASSEMBLING

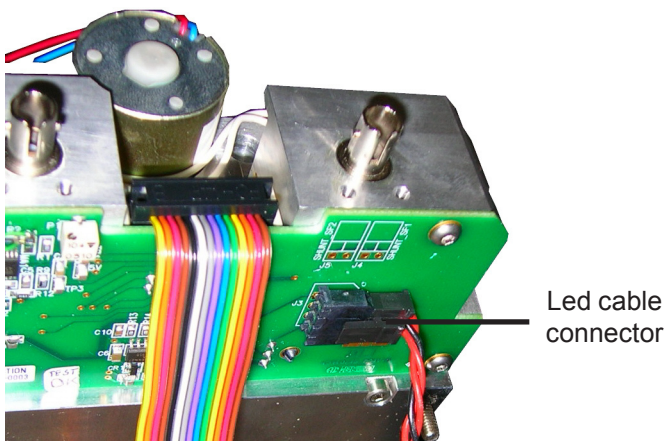
4-4-1 532nm OPTICAL BLOCK

⚠ WARRANTY VOID IF THE CAVITY IS OPENED ⚠

- remove the rear panel (see § 4-3-1).
- Unplug all cables and wirings on the cavity board (situated at the back of the cavity).
- Unplug the fan cable on the power board.
- Disconnect the ground cable linking the cavity side to the rear panel taking care of the 2 rings.
- Unscrew the 3 screws of the diode suply cables on the power board.

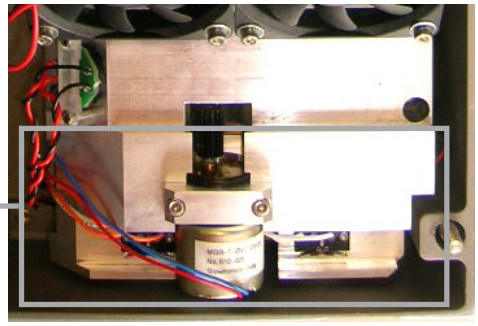


- Pull out slightly the cavity to access to the led cable connector situated on the injection board under the cavity.
- Unplug it.
- Remove the cavity.

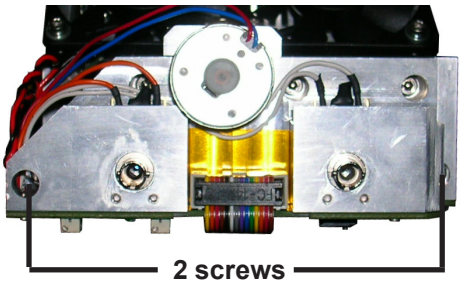


4-4-2 532nm INJECTION BLOCK

It is situated to the front of the cavity.



- Unscrew the 2 screws.

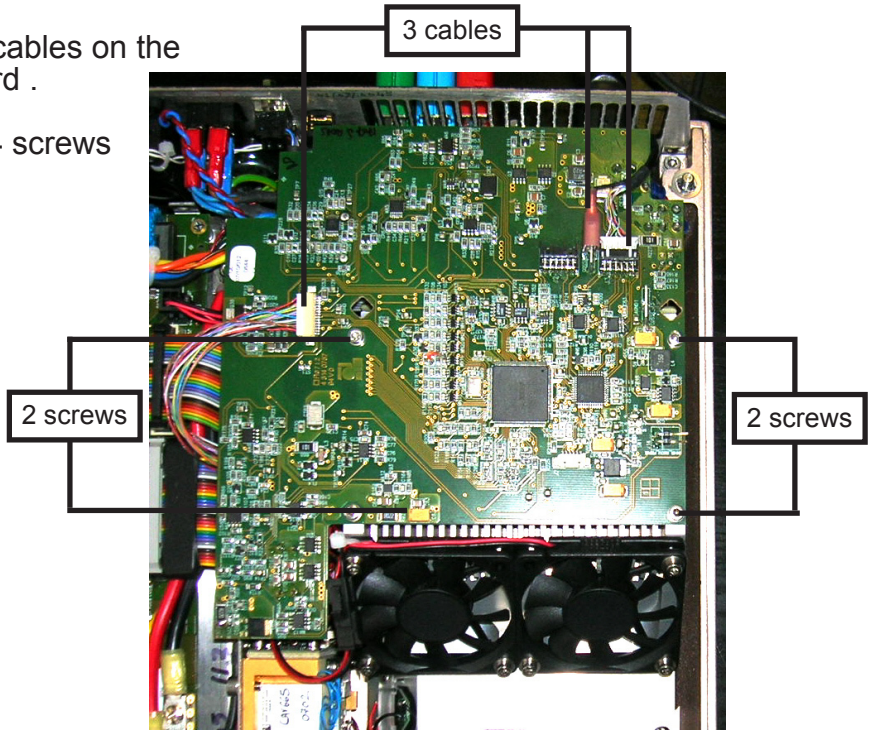


4-5 660 & 810nm SUBSYSTEM DISASSEMBLING

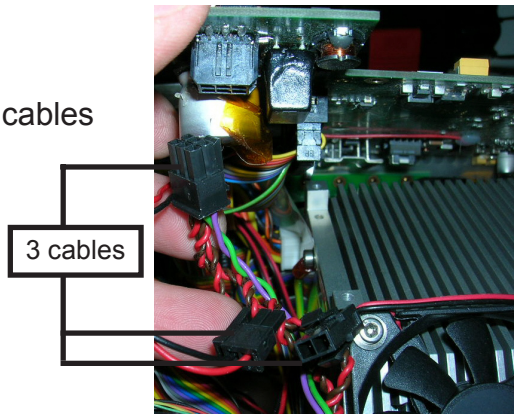
4-5-1 OPTION POWER BOARD

- Unplug the 3 cables on the upper side board .

- Unscrew the 4 screws indicated.

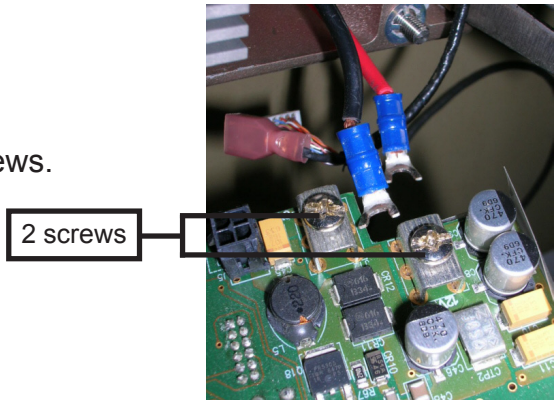


- lift up the board slightly and the 3 cables under the left-hand board side.

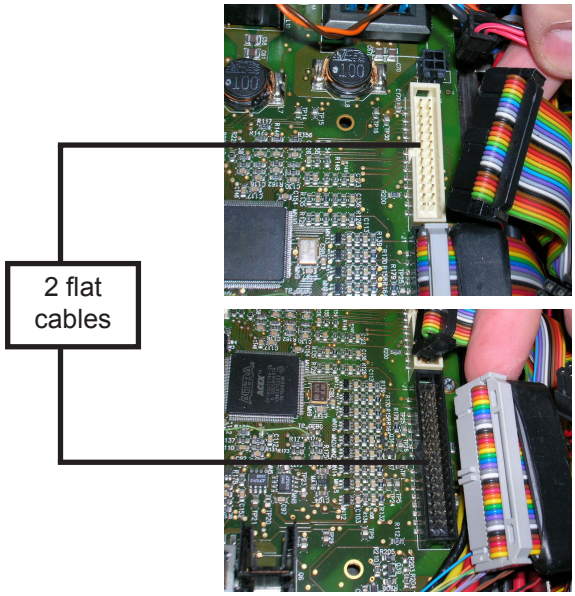


- Put the board upside-down by its left-hand side.

- Unscrew the 2 power suply screws.



unplug the 2 flat cables on the power board.

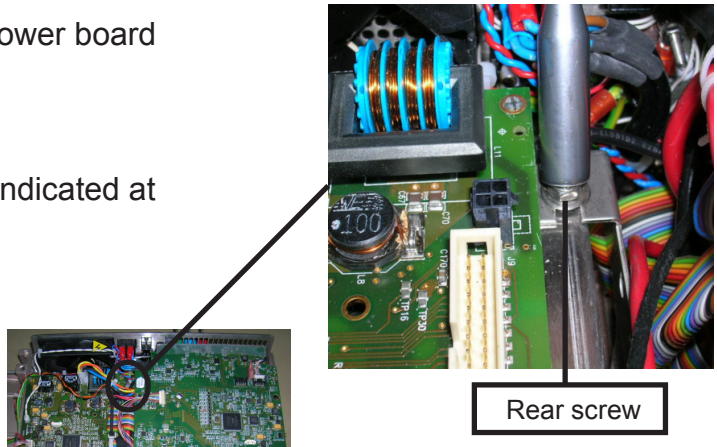


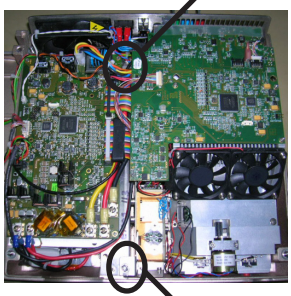
4-5-2 OPTION OPTICAL BLOCK

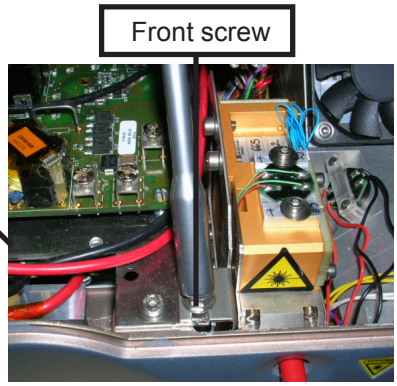
WARRANTY VOID IF THE CAVITY IS OPENED

- remove the option power board (see § 4-5-1).

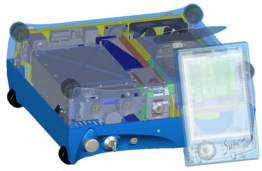
- Unscrew the screw indicated at the rear of the laser.







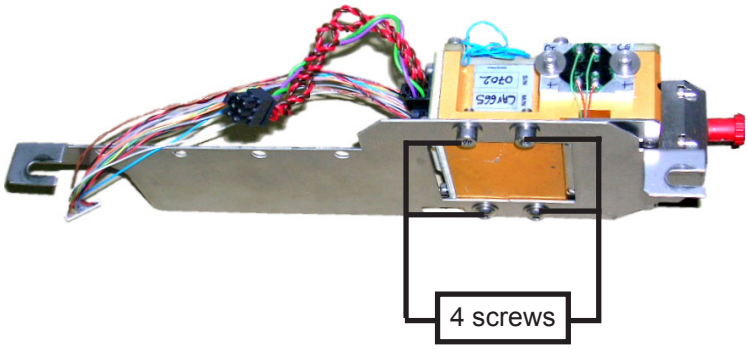
- Unscrew the screw indicated at the front of the laser.

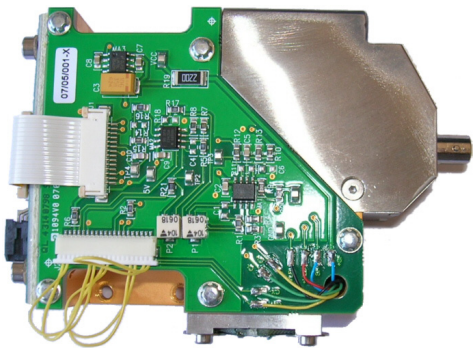


4 DISASSEMBLING

Pull and slide the optical block
(cavity with its chassis) by the rear.

Unscrew the 4 screws indicated.





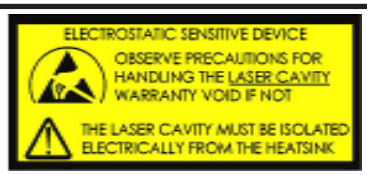
Cavity
block

4-6 577nm SUBSYSTEM DISASSEMBLING

4-6-1 OPTICAL BLOCK

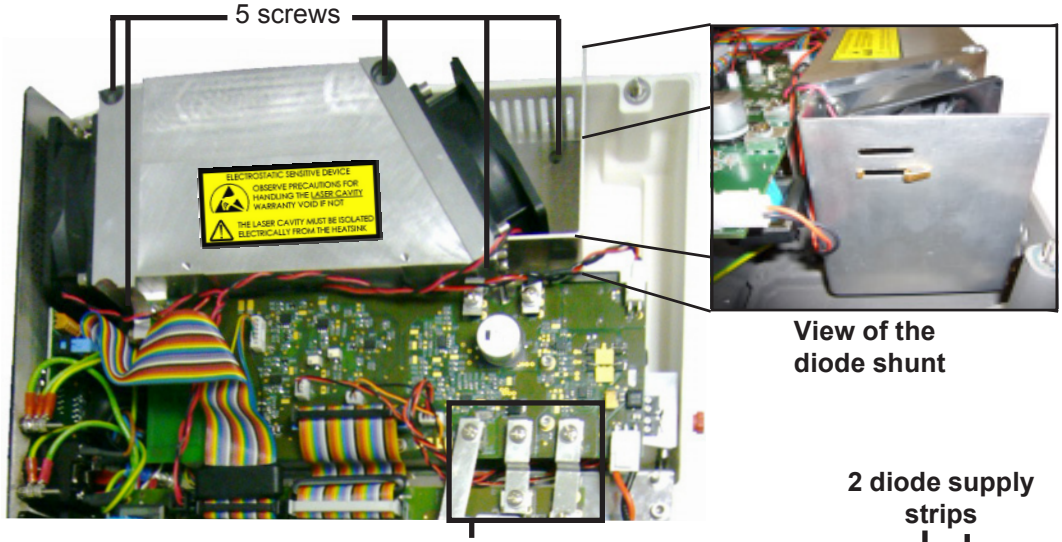
The cavity is alive when DL is on.
To manipulate it turn off completly the laser and unplug the mains cord.

Particular precautions must be taken to avoid ESD on the cavity.


ELECTROSTATIC SENSITIVE DEVICE
OBSERVE PRECAUTIONS FOR HANDLING THE LASER CAVITY WARRANTY VOID IF NOT
THE LASER CAVITY MUST BE ISOLATED ELECTRICALLY FROM THE HEATSINK

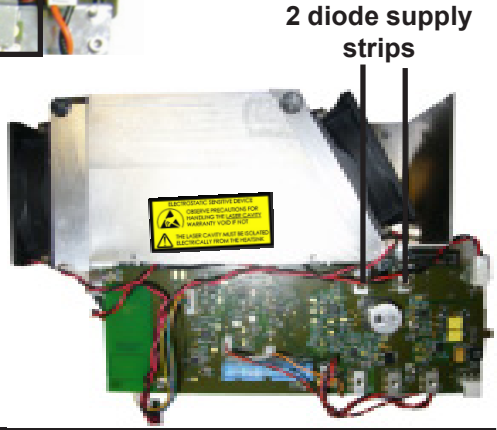
WARRANTY VOID IF THE CAVITY IS OPENED

- remove the rear panel (see § 4-3-1).
- Unplug all cables and wirings on the cavity board.
- Unplug the fan and Peltiers cables on the power board.
- Disconnect the ground cable linking the cavity side to the rear panel taking care of the ring.
- Unscrew the 6 screws of the diode suply strips on the power board and interface board.
- Unscrew the 5 screws of the cavity.



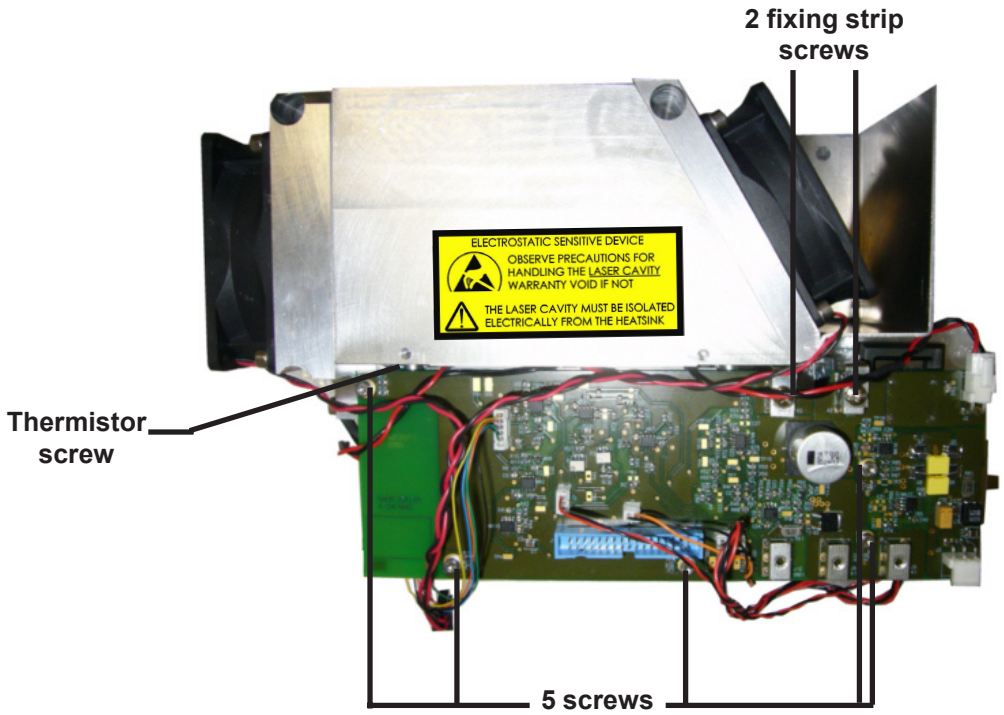
- Pull out slightly the cavity block to the rear device and remove it.

- Place the diode shunt between its 2 supply connections.



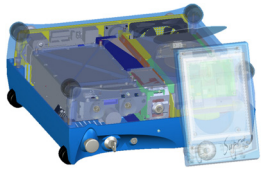
4-6-2 CAVITY BOARD

It is situated to the front of the cavity.
- Unscrew the thermistor from the dissipator.
- Unscrew the 2 fixing screws of the diode connection strips.
- Unscrew the 5 screws.


2 fixing strip screws
ELECTROSTATIC SENSITIVE DEVICE
OBSERVE PRECAUTIONS FOR HANDLING THE LASER CAVITY WARRANTY VOID IF NOT
THE LASER CAVITY MUST BE ISOLATED ELECTRICALLY FROM THE HEATSINK
Thermistor screw
5 screws

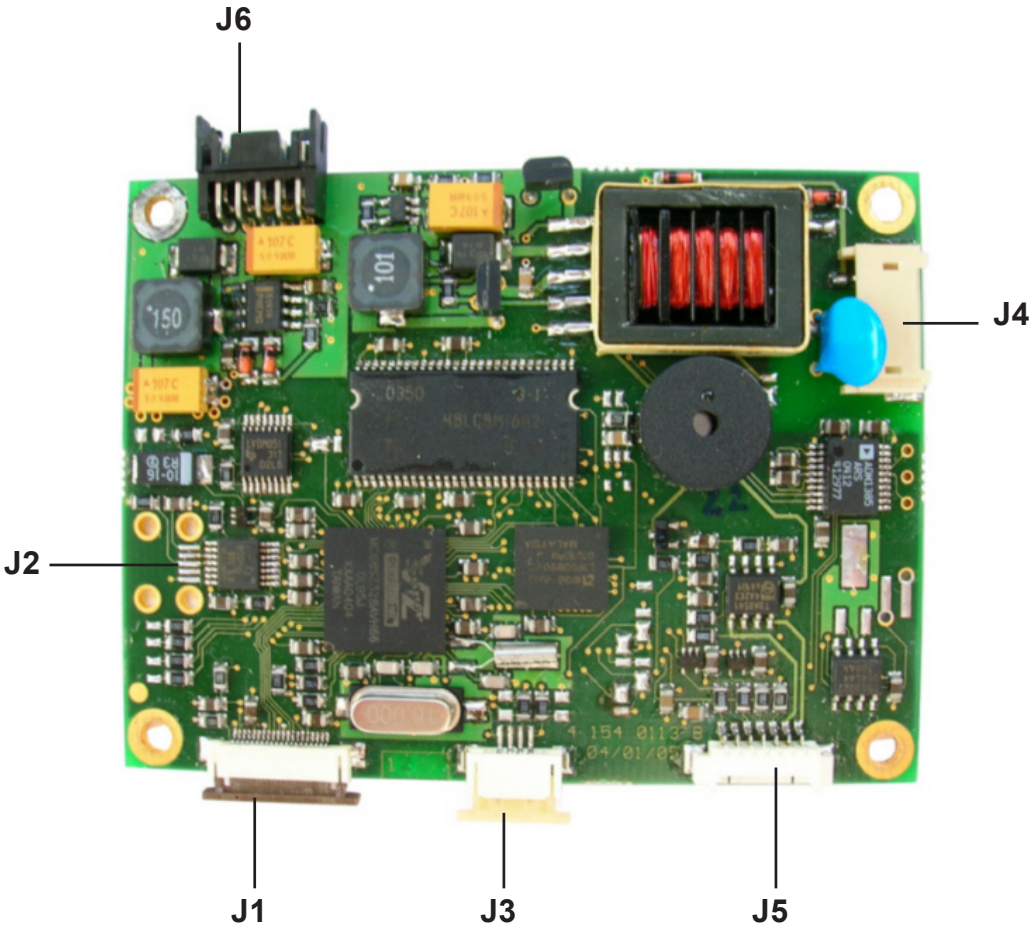
5

LOCATION AND CONNECTOR PIN DESCRIPTION



5 LOCATION AND CONNECTOR PIN DESCRIPTION

5-1 CPU BOARD (ENDO.MICRO)

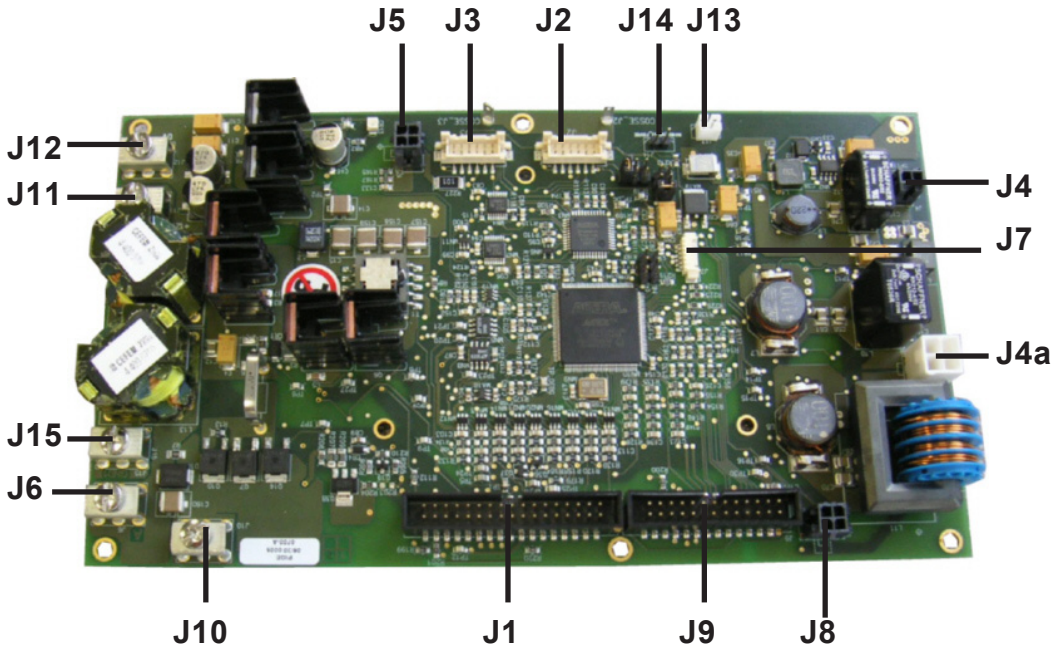


Connector	Pin	Signal
J1	1	FRM
	2	LP
	3	CP
	4	Disp
	5-16-17	3.3 V
	6	
	7	VCont
	8	LD7
	9	LD6
	10	LD5
	11	LD4
	12	LD3
	13	LD2
	14	LD1
	15	LD0
	18-19-20	NC

Connector	Pin	Signal
J2	1	Vbus
	2	D-
	3	D+
	4	ID
	5	Gnd
J3	1	Left
	2	Top
	3	Right
	4	Bottom
J4	1	
	2	
J5	1	Led 1
	2	Gnd
	3	Led 2
	4	CWB
	5	CWA
	6-7	NC

Connector	Pin	Signal
J6	1	+ 12V
	2	0V
	3	SPRX +
	4	SPRX -
	5	SPTX +
	6	SPTX -
	7	SPCK +
	8	SPCK -
	9	TX 2
	10	RX 2
J7	1	TX 1
	2	Gnd
	3	RX 1

5-2 POWER BOARD (PB.NG)

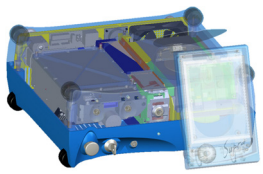


Connector	Pin	Signal
J1	1	Fiber security 1
	2	Fiber security 2
	3	Temp KTP +
	4	Temp KTP -
	5	Temp Diode +
	6	Temp Diode -
	7	Temp YVO4 +
	8	Temp YVO4 -
	9	Internal cell +
	10	Internal cell -
	11	External cell +
	12	External cell -
	13	Humidity +
	14	Humidity -
	15	Aiming diode +
	16	Aiming diode -
	17	+ 12V
	18-25--26-27--28-29	NC
	19	Temp ext
	20	Detect 532
	21	Mot 1 pos
	22	Mot 2 pos
	23	Mot +
	24	Mot -
	30	Beam detect
	31	Cmd µP
	32	Conf µP
	33	Diode consign
	34	SD µP

Connector	Pin	Signal
J2	1	+12V
	2	Gnd
	3	CH_SPRX+
	4	CH_SPRX-
	5	CH_SPTX+
	6	CH_SPTX-
	7	CH_SPCK+
	8	CH_SPCK-
	9	SW 3 - 2
	10	SW 4 - 2
	11	Secu 1
	12	Secu 2
J3	1	+12V
	2	Gnd
	3	CH_SPRX+
	4	CH_SPRX-
	5	CH_SPTX+
	6	CH_SPTX-
	7	CH_SPCK+
	8	CH_SPCK-
	9	SW 3 - 2
	10	SW 4 - 2
	11	HP+
	12	HP-
J4	1	Peltier KTP +
	2	Peltier KTP -
J4a	1	Peltier Diode +
	2	Peltier Diode -
	3	Peltier YVO4 +
	4	Peltier YVO4 -

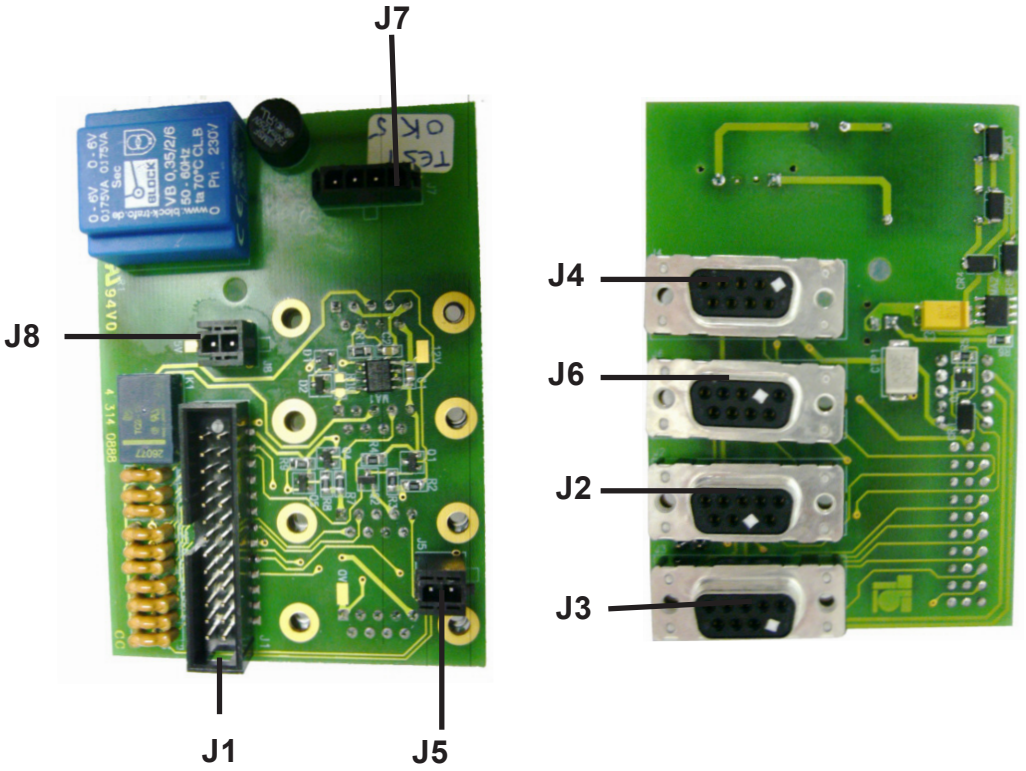
Connector	Pin	Signal
J5	1	+ 12V
	2	+ Lamp
	3	Filtre med pos
	4	- Lamp
J6	1 to 6	DL A
J7	1	+3,3V
	2	TMS
	3	TCK
	4	TDI
	5	TDO
	6	Gnd
J8	1-3	Internall fan +
	2-4	Internall fan -
J10	1 to 6	DL K
J11	1 to 6	+12V
J12	1 to 6	Gnd
J13	1	HP+
	2	HP-
J14	1	inhib secu fiber
	2	Gnd
J15	1 to 6	µpulse

Connector	Pin	Signal
J9	1	+ 12V
	2	Gnd
	3	Filtre 2 med pos
	4	Filtre 2 med pres
	5	CmdFiltre 2 med
	6	Remote
	7	Zoom
	8	Pedal detect
	9	pedal 1
	10	pedal 2
	11	pedal 3
	12	pedal 4
	13	TX 1
	14	RX 1
	15	SAV
	16	Remote out
	17	External fan +
	18	Gnd
	19	Filtre 3 med pos
	20	Filtre 3 med pres
	21	CmdFiltre 3med
	22	NC



5 LOCATION AND CONNECTOR PIN DESCRIPTION

5-3 I/O BOARD (FAR.YEL)



Connector	Pin	Signal
J1	1	Temp ext
	2	Gnd
	3	Filtre 2 med pos
	4	Filtre 2 med pres
	5	CmdFiltre 2 med
	6	Remote
	7	Zoom
	8	Pedal detect
	9	pedal 1
	10	pedal 2
	11	pedal 3
	12	pedal 4
	13	TX 1
	14	RX 1
	15	SAV
	16	Remote out
	17	Internal fan +
	18	Internal fan -
	19	Detect fib opt
	20	532/577 detect pos
	21	CmdFiltre 3 med
	22-23-24--25-26	NC

Connector	Pin	Signal
J2	1	+ 12V
	2	RX 1
	3	Remote
	4	Gnd
	5	SAV
	6	TX 1
	7	Polarizing slot
	8	Remote out
	9	Remote out
J3	1	Gnd
	2	Pedal detect
	3	pedal 2
	4	NC
	5	+ 12V
	6	Polarizing slot
	7	pedal 1
	8	pedal 3
	9	pedal 4
J5	10	Internal fan +
	11	Internal fan -
J8	16	Led +
	17	Led -

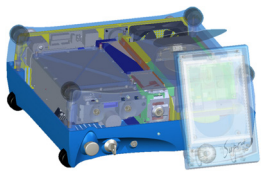
Connector	Pin	Signal
J4	1	Polarizing slot
	2	Gnd
	3	Filtre 2 med pos
	4	CmdFiltre 2 med
	5	Gnd
	6	NC
	7	Zoom
	8	Filtre 2 med pres
	9	+ 12V
J6	1	Gnd
	2	NC
	3	Detect fib opt
	4	CmdFiltre 3 med
	5	Gnd
	6	NC
	7	NC
	8	532/577 detect pos
	9	+ 12V
J7	1	Line
	2	NC
	3	Neutral
	4	NC

5-4 POWER SUPPLY

Connector	Pin	Signal
J1	1	Line
	2	Neutral
	3	Earth

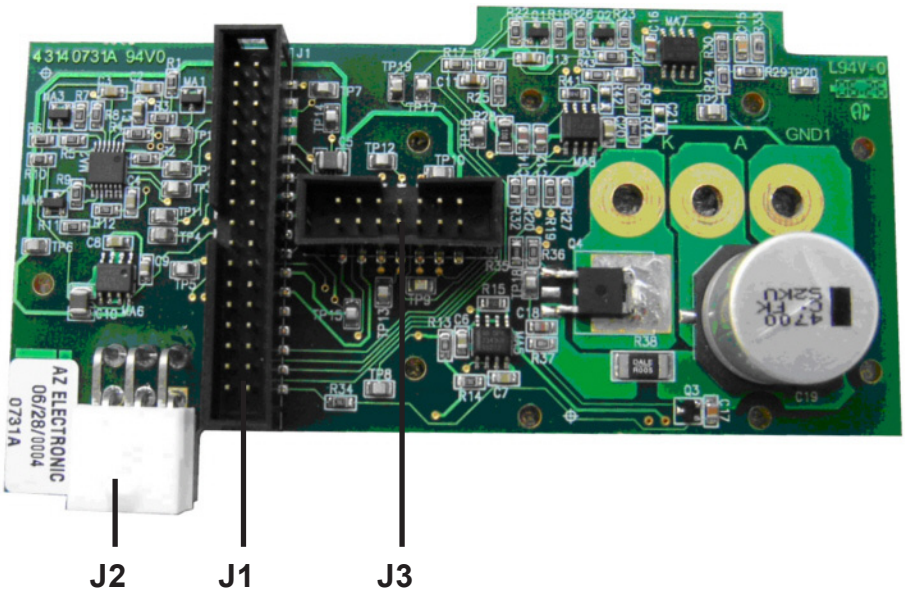
Connector	Pin	Signal
J4	1-3--5--6-7-8	NC
	2	- V stby return
	4	Inhibit
J5	-	Gnd
J6	-	+12V

J3 global option: Emergency stop button



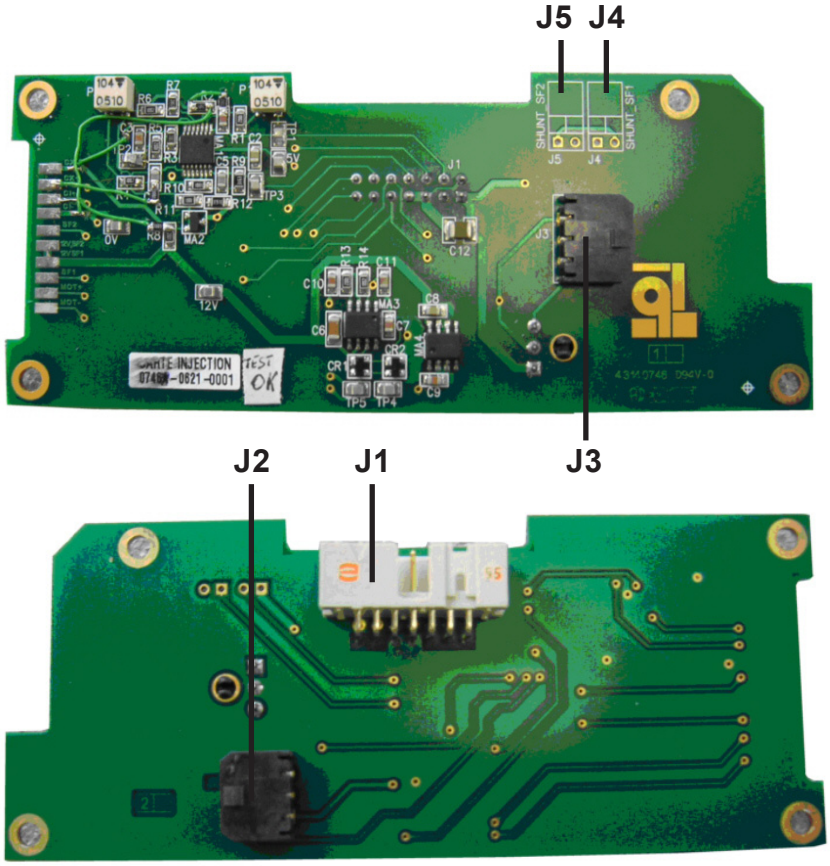
5 LOCATION AND CONNECTOR PIN DESCRIPTION

5-5 532nm CAVITY BOARD (CAV.NG)



Connector	Pin	Signal	Pin	Signal	Connector	Pin	Signal
J1	1	Fiber security 1	16	Aiming diode -	J3	1	+12V
	2	Fiber security 2	17	+ 12V		2	Gnd
	3	Temp KTP +	18-25-26--27-28-29	NC		3	Beam detect
	4	Temp KTP -	19	Temp ext		4	Internal cell +
	5	Temp Diode +	20	Detect 532		5	Internal cell -
	6	Temp Diode -	21	Mot 1 pos		6	External cell +
	7	Temp YVO4 +	22	Mot 2 pos		7	External cell -
	8	Temp YVO4 -	23	Mot +		8	Detect 532
	9	Internal cell +	24	Mot -		9	SF1
	10	Internal cell -	30	Beam detect		10	SF2
	11	External cell +	31	Cmd µP		11	M+
	12	External cell -	32	Conf µP		12	M-
	13	Humidity +	33	Diode consign		13	MP1
	14	Humidity -	34	SD µP		14	MP2
	15	Aiming diode +					
J2	1	Peltier KTP -	4	Peltier Diode -			
	2	Peltier Diode +	5	Peltier YVO4 +			
	3	Peltier KTP +	6	Peltier YVO4 -			

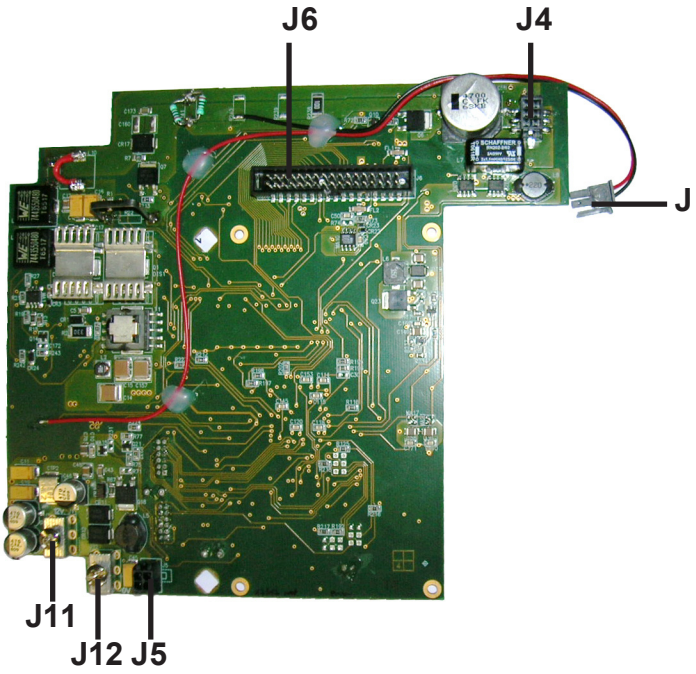
5-6 532nm INJECTION BOARD (INJ.NG)

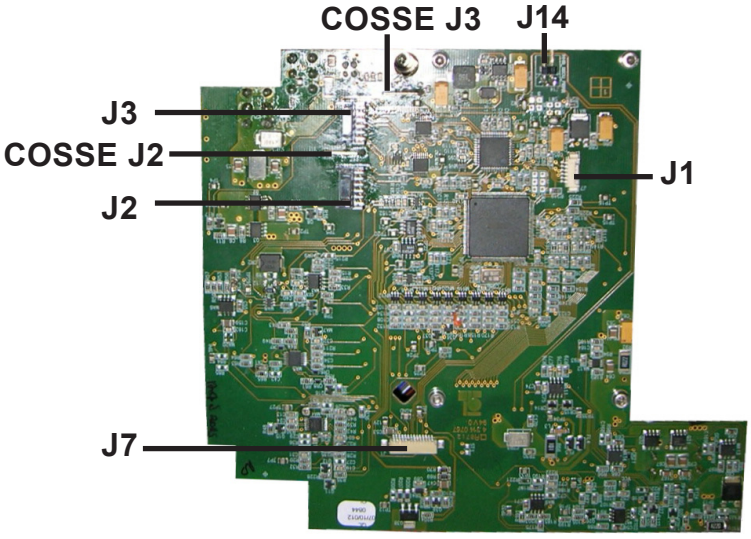


Connector	Pin	Signal
J1	1	+12V
	2	Gnd
	3	NC
	4	Internal cell +
	5	Internal cell -
	6	External cell +
	7	External cell -
	8	Detect 532
	9	SF1
	10	SF2
	11	M+
	12	M-
	13	MP1
	14	MP2

Connector	Pin	Signal
J2	1	+12V
	2	MP1
	3	MP2
J3	1	MP1
	2	Gnd
	3	MP2
J4	1	SF1
	2	+12V
J5	1	+12V
	2	SF2

5-7 660 & 810nm OPTION POWER BOARD





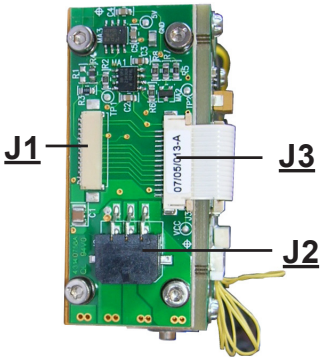
LOCATION AND CONNECTOR PIN DESCRIPTION

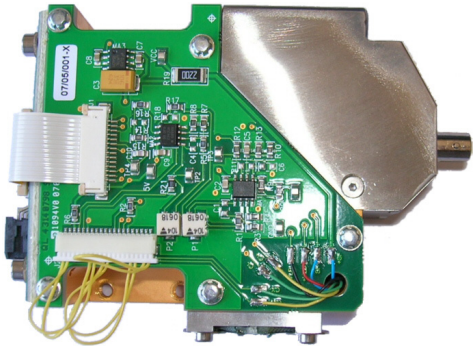
Connector	Pin	Signal
J1	1	+12V
	2	Gnd
	3	Detect faisceau
	4	RET_CELLULE INT-
	5	RET_CELLULE INT+
	6	RET_CELLULE EXT-
	7	RET_CELLULE EXT+
	8	SF
	9	DETECT810
	10	TEMP EXT
	11	TEMP PELT+
	12	TEMP PELT-
	13	+VLD (=DV+)
	14	-VLD (=DV-)
J2	1	NC
	2	Gnd
	3	CH_SPRX+
	4	CH_SPRX-
	5	CH_SPTX+
	6	CH_SPTX-
	7	CH_SPCK+
	8	CH_SPCK-
	9	SW 3 - 2
	10	SW 4 - 2
	11	SECU 3
	12	SECU 4
Cosse J2	1	Gnd
J3	1	+12V
	2	Gnd
	3	CH_SPRX+
	4	CH_SPRX-
	5	CH_SPTX+
	6	CH_SPTX-
	7	CH_SPCK+
	8	CH_SPCK-
	9	SW 1 1-2-3
	10	SW 2 1-2-3
	11	SECU 1
	12	SECU 2
Cosse J3	1	Gnd

Connector	Pin	Signal
J4	1-4	AN_DL
	2-5	K_DL
	3	PELTIER+
	6	PELTIER-
J5	1	+12V
	2	+LAMPE
	3	FILTRE_MED_POS
	4	Gnd
J6	1-17-18--25-29-33	NC
	2-23-32	Gnd
	3	Filtre 2 med pos
	4	Filtre 2 med pres
	5	CmdFiltre 2 med
	6	Remote
	7	Zoom
	8	Pedal detect
	9	pedal 1
	10	pedal 2
	11	pedal 3
	12	pedal 4
	13	TX 1
	14	RX 1
	15	SAV
	16	Remote out
	19	Filtre 3 med pos
	20	Filtre 3 med pres
	21	CmdFiltre 3 med
	22	+VENT
	24	+12V
	26	ZOOM_MOT+
	27-34	+12V filtré
	28	ZOOM_MOT-
	30	ZOOM_MOT_PRES
	31	POS_ZOOM_MOT_IN
J7	1	+3.3V
	2	TMS
	3	TCK
	4	TDI
	5	TDO
	6	Gnd

Connector	Pin	Signal
J11	1-2-3-4--5-6	+12V
J12	1-2-3-4--5-6	Gnd
J14	1	+3.3V
	2	Gnd
J		RET_SHUTTER_1
		Gnd

5-8 660 & 810nm OPTION CAVITY BOARD

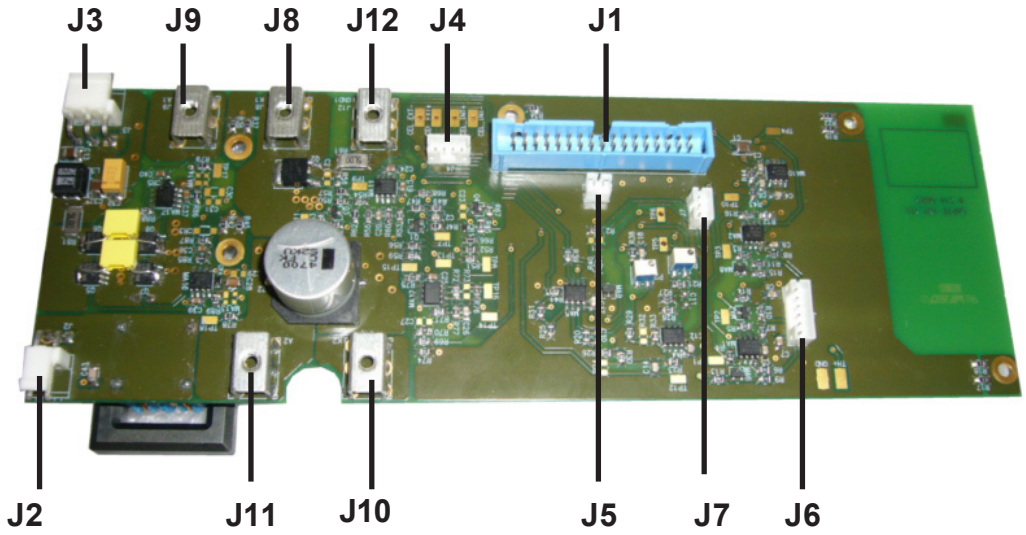




Connector	Pin	Signal
J1	1	FI1A
	2	Gnd
	3-6-9-11-12	NC
	4	A_PHD
	5	K_PHD1
	7	K_PHD2
	8	FI1B
	10	Temp
	13	+VLD
	14	-VLD

Connector	Pin	Signal
J2	1	AN_DL
	2	AN_DL
	3	K_DL
	4	K_DL
	5-6	NC

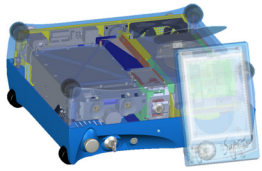
5-9 577nm CAVITY INTERFACE BOARD (INT.YEL)



Connector	Pin	Signal
J1	1	Fiber security
	2	NC
	3	Temp BRF +
	4	Temp BRF -
	5	Temp CASE +
	6	Temp CASE -
	7	Temp LBO +
	8	Temp LBO -
	9	Internal cell +
	10	Internal cell -
	11	External cell +
	12	External cell -
	13	Humidity +
	14	Humidity -
	15	Aiming diode +
	16	Aiming diode -
	17	+ 12V
	19	Temp ext
	20	Detect 577
	23	PELTIER +
	24	PELTIER -
	30	Beam detect
	31	Cmd µP
	32	Conf µP
	33	Diode consign
	34	SD µP

Connector	Pin	Signal
J2	1	PELTIER output +
	2	PELTIER output -
J3	1	+12V PELTIER
	2	Gnd
J4	1	Internal cell +
	2	Internal cell -
	3	External cell +
	4	External cell -
J5	1	Aiming diode +
	2	Aiming diode -
J6	1	Temp BRF +
	2	Temp BRF -
	3	Temp CASE +
	4	Temp CASE -
	5	Temp LBO +
	6	Temp LBO -
J7	1	+12V
	2	NC
	3	Fiber security
J8	1	K
	2	
	3	
	4	
	5	

Connector	Pin	Signal
J9	1	A
	2	
	3	
	4	
	5	
J10	1	K
	2	
	3	
	4	
	5	
J11	1	A
	2	
	3	
	4	
	5	
J12	1	Gnd PB
	2	
	3	
	4	
	5	



6

SERVICING AND CALIBRATION

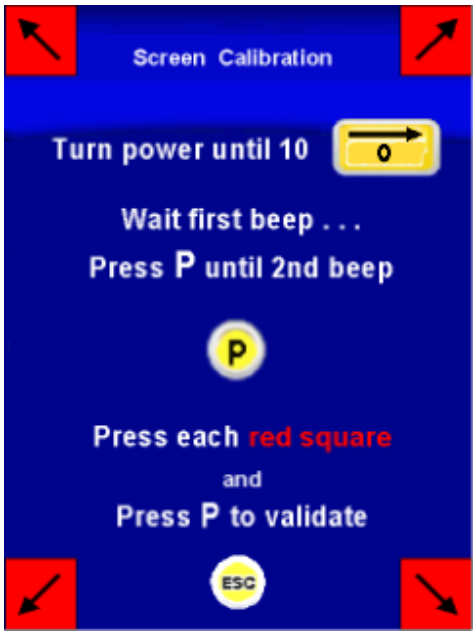
6-1 TOUCH SCREEN CALIBRATION

The position of the touch-screen-sensitive area can be calibrated.
It can be necessary after a transport, a screen assembly changing, a software upgrade or other which could change the touch screen calibration.

This calibration can be done in '**doctor mode**' as in '**service mode**'.
Turn the key to '**ON**' and wait for the home page display.
Turn the power knob clockwise until '**Calibration**' displays on the screen.

NOTE: **Read the entire procedure before to start.**

1- Turn the power knob ten steps to the right.
The number of each step displays into the yellow area except the tenth who displays '**GO**' message.



2- Wait for the first beep;
it is the begining of the calibration procedure.

3- Press '**P**' until to hear the second beep.

4- Then press successively the 4 screen corners.
Each time a corner is pressed, repetitive beeps will be hear.
It says that the screen pressure is correctly recognized.
Go to the following corner.

NOTE: **To obtain a better result, it is recommended to press the screen with a thin plastic stick, like a PDA pencil.**

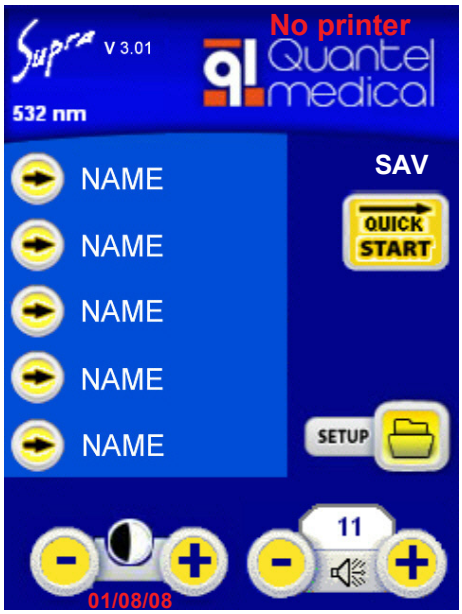
5- At the end, press '**P**' again to complete the procedure and exit the calibration page.

The screen comes back to the home page.

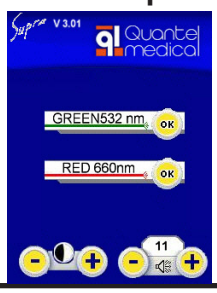
6-2 SERVICE MODE

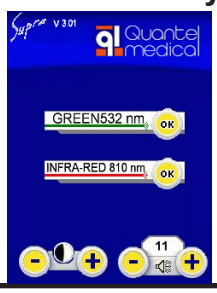
The access to the service mode needs to plug the service remote (its wiring is illustrated at the section 10-3).

Switch on the main switch and turn the key to ON.

SCREEN PAGE	AREA	FUNCTION
Home page in service mode 		**SUPRA logo:** Press it 3s to access to the service statistics (see § 6-4).
		QL logo: By pressing it the printer option is **ENABLE** or **DISABLE**. Printer No Printer
	SAV	**SAV mode indicator:** Indicates that the laser is switched in service mode.
		QUICK START button: Access to the service page (see § 6-2-1).
		USER FOLDER button: Access also to the service page.
		SETUP button: Access to the folder setup.
		VOLUME buttons: Sound volume adjustment.
		CONTRAST buttons: Screen contrast adjustment.
	01/08/08	**Software revision date:** Indicates the software manufacturing date.

NOTE: **For 660nm and 810nm SUPRA TWIN options, it is necessary to choose the desired wavelength before to display the home page.**





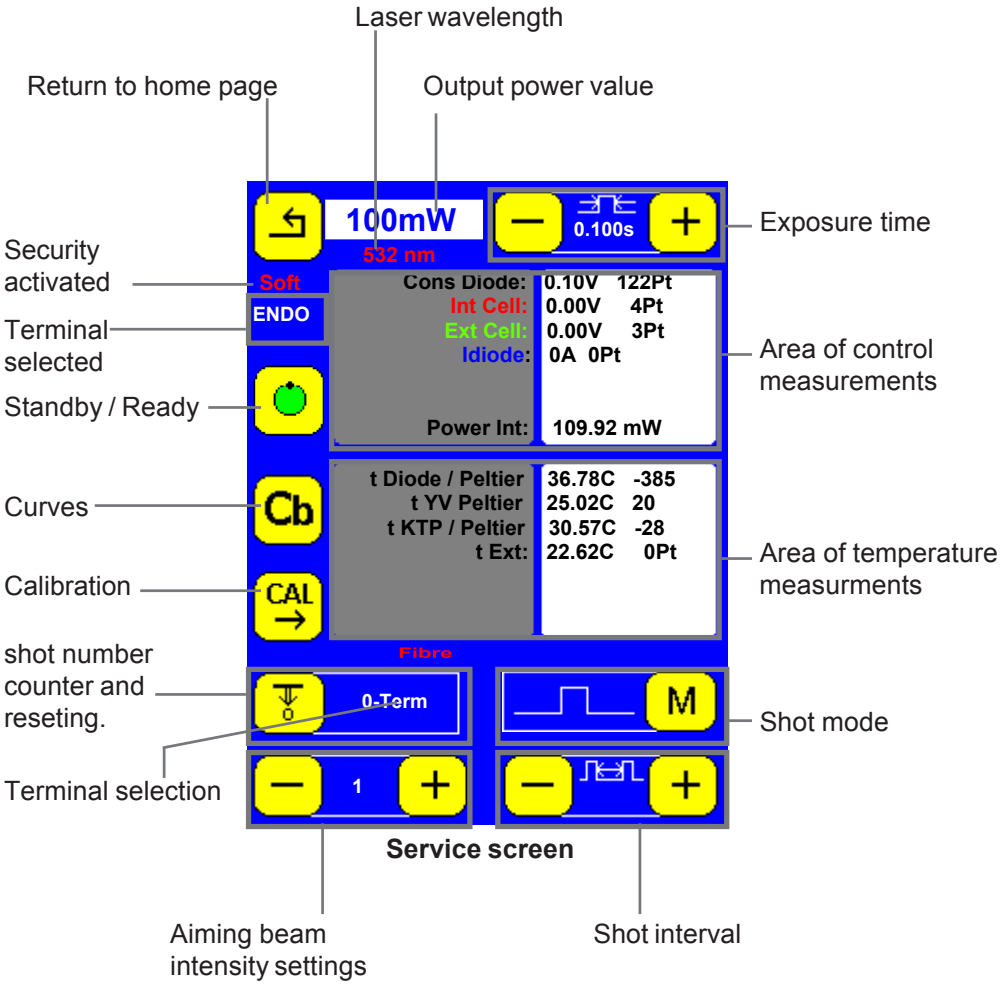
6-2-1 SERVICE SCREEN DESCRIPTION

IMPORTANT

**AFTER EACH USE IN SERVICE MODE,
THE INSTRUMENT MUST BE SWITCHED OFF COMPLETLY
BY TURNING THE KEY TO 'OFF' POSITION.**

The screen meant below shows the default parameters for power, exposure time, shot interval and terminal.
They are the same for each terminal.

NOTE: **The service page described below is representative of the pages of each laser (SUPRA, SUPRA TWIN and SUPRA 577·Y) except information of some zones which could be specific to a laser.**

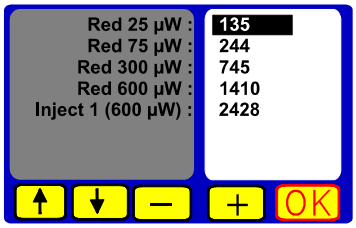


BUTTON FUNCTION		
	Back:	Validates the parameters and return to the previous page.
	Standby / Ready:	Enables or disables firing.
	Calibration:	Access to the terminal calibration page. *** See section 6-2-3 ***
	Curves:	Access to the shot curves of diode and cells. *** See section 6-2-2 ***
	Exposure time:	Sets the exposure time. **0,010s to 60s**
	Shot interval:	Time adjustment between 2 pulses in repeat mode. **0,1 - 0,15 - 0,2 - 0,3 - 0,4 - 0,5 - 0,6 - 0,7 - 1 s**
	Shot mode:	Sets the shot mode. **Single - Repeat - Painting - Continuous**
	Counter:	Displays the laser shot number. Press button to reset it.
	Aiming beam:	Sets the aiming beam intensity.

AREA FUNCTION

100mW **Power display:** Press the 330mW value display to enter in Production mode. See section 6-3.

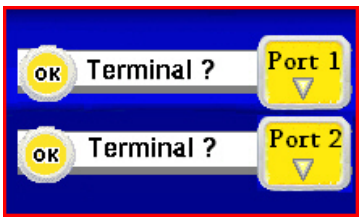
Aiming calibration: Press aiming beam value to display its calibration window.



'Settings' window: Press interval value to display the 'settings' window.

0-Term **Terminal selection:** Press the 'Term' display to call the terminal selection window.

SUPRA 532nm



SUPRA TWIN and SUPRA 577·Y

Select the desired terminal and its output port with the arrow key and validate it by pressing 'OK' key.

INFORMATION AREA

100mW **Output power:** Displays the power output set and available at the output of the delivery system.

Soft
Hard **Operational: Securities** Soft and Hard operationals securities. Hard operationals securities (only used in production area)

ENDO **Terminal selected:** Displays the terminal selected by the technician.

	532nm	577nm	660nm	810nm
ENDO / PROBES	X	X		X
LIO	X	X		X
S/L	X	X		X
MICRO	X	X		X
PHOTON	X	X		X
PRP			X	X
TTT				X

CONTROL PARAMETER AREA

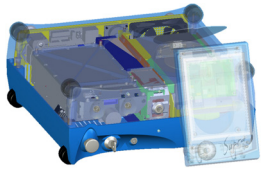
Cons Diode:	0.07V	92Pt
Int Cell:	0.00V	2Pt
Ext Cell:	0.01V	8Pt
Idiode:	0.063A	260Pt
Power Int:	29.00mW	

These parameters can not be modified.
They are available in analogic (Volts or Amps) as in numeric (points from 0 to 4095).

Cons diode: This is the command voltage for pumping diode. This voltage is modulated between 0 and 3 Volts according to the power setting.

Int cell: This is the internal cell reading value. it is adjusted by the software during the cavity calibration.
This value can be measured on test point:
532nm INJECTION board TP1
577nm INTERFACE board TP5

Ext Cell: This is the external cell reading value. it is adjusted by the software during the cavity calibration.
This value can be measured on the test point:
532nm INJECTION board TP2
577nm INTERFACE board TP6
The external cell follow the internal one and is adjusted in production area to be superimposed on the curve screen with 5% tolerance at:
577nm = 1W (1,1W in Prod mode) .



I diode: This is the current used by the diode to produce the laser effect according to the cell readings. This value is adjusted during the cavity calibration and terminals calibrations and can be measured on the test point:
POWER BOARD TP9

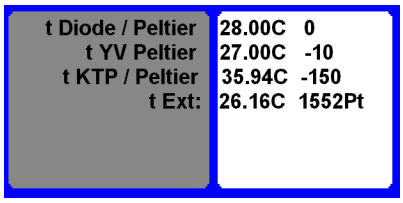
Power int: This is the power at the cavity output which depends of the terminal efficiency set during terminal calibration.

These values are updated in real time before and during the shots:

- Standby and Ready mode:
- '**Cons Diode**' depends on the displayed power.
- The cells do not see a laser beam (0V).
- The diode current is zero
(577nm Iveille around 10A in ready status).
- '**Power Int**' depends on the displayed power and the terminal calibration.

- Firing: High current in the diode
The internal and external cells see a laser beam (voltages).
The cell values must be superimposed (with 5% tolerance) at the power of:
577nm = 1W in SAV mode

532nm CAVITY COMPONENT TEMPERATURE



The temperatures are indicated in Celsius degree.

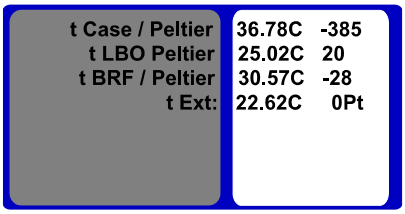
T diode: This is the diode temperature which is adjusted in production area.

T YV: This is the crystal temperature

T KTP: This is the frequency doubled crystal temperature.

T ext: This is the temperature measured around the electronic boards. The sensor is set to start a locking alarm when temperature is up to 35°C and down to 10°C.

577nm CAVITY COMPONENT TEMPERATURE



The temperatures are indicated in Celsius degree.
The gathering component temperature are set in production area and defined by the cavity manufacturer.

WARNING: **THESE COMPONENT TEMPERATURES MUST NOT BE CHANGED AT THE RISK OF CAVITY DESTRUCTION.**

T CASE: This is the diode temperature.

T LBO: This is the frequency doubling crystal temperature

T BRF: This is the birefringent filter temperature.

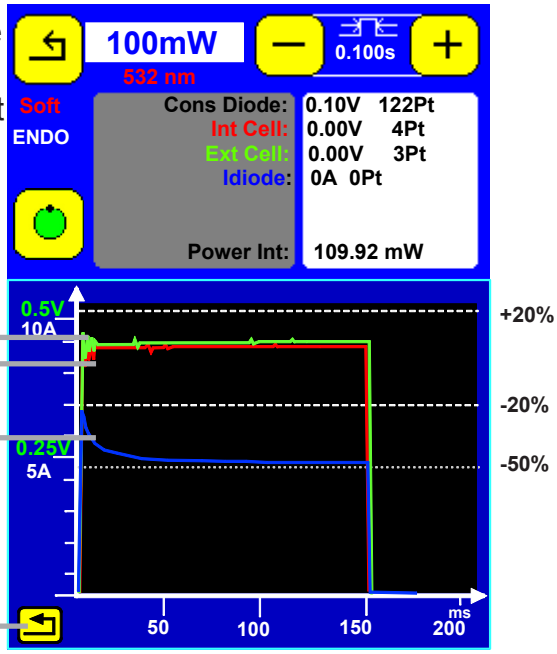
T ext: This is the temperature measured on the dissipator. The sensor is set to start a locking alarm when temperature is up to 45°C and down to 10°C.

660nm & 810nm CAVITY COMPONENT TEMPERATURE

No cavity component is regulated in temperature.

6-2-2 CURVES

The pumping diode current and the power measurements from the Internal/External cells since the last shoot, can be displayed on the curve screen.
It is called by pressing '**Cb**' button



Before or after the curve window calling, a shot must be done to be displayed.
The curves are refreshed after each shot.
The scales are set automatically.

The cell curves must be superimposed with a maximal deviation of ±5% and within the range ±20% from requested value.

See chapter 8 for more explanations about these curves.

6-2-3 TERMINAL CALIBRATIONS

6-2-3-1 CONTINUOUS TERMINAL CALIBRATION

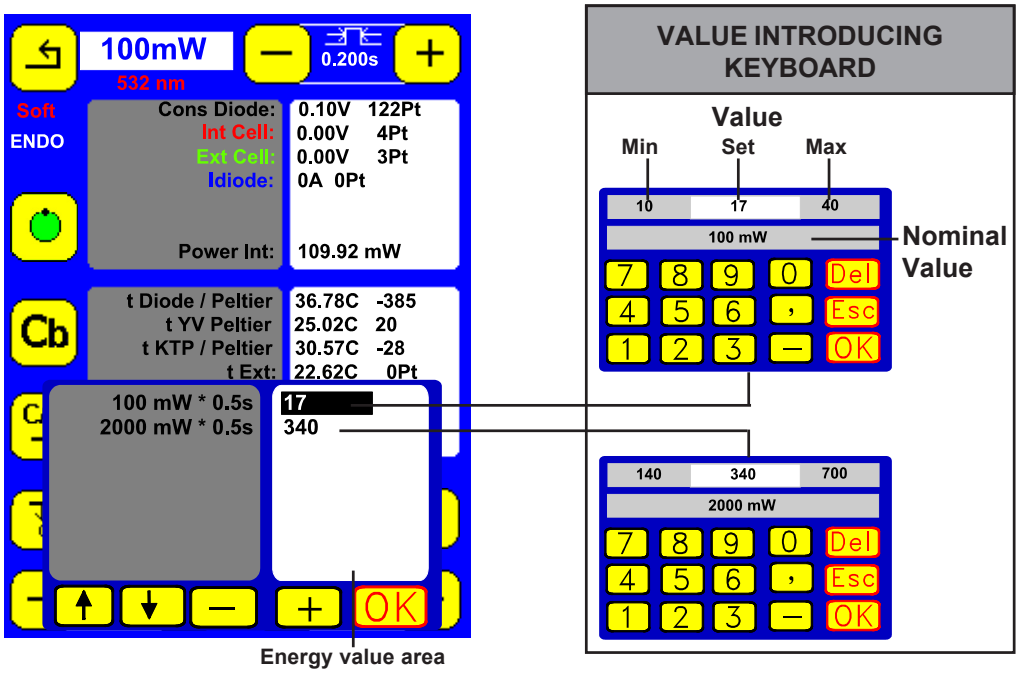
CAUTION: Before any calibration, check and set to the default value (500mW) the doctor calibration.

The terminal calibration must be done during laser installation. The 4 terminals are calibrated in manufacturing area with standard values. Before every calibration, check the laser spot (well defined and homogeneous) and the maximum power at the delivery system output.

This is the adjustment of the necessary cavity power according to the power loss in the terminal.
This calibration must be done with terminal adapter connected to the laser and an external Joulemeter.

CAUTION: An individual calibration must be realized for each connected delivery system.

Press "**CAL**" button to access to the '**Terminal calibration**' window.



The calibration is made at several power nominal values (selected by the arrow buttons):

CONTINUOUS TERMINAL CALIBRATION POINTS				
SUPRA 532	SUPRA TWIN 660	810	SUPRA 810	SUPRA 577 Y
100 mW	100 mW	100 mW	100 mW	100 mW
2000 mW	300 mW	1500 mW	1500 mW	2000 mW
-	700 mW	3000 mW	3000 mW	

PROCEDURE:

IMPORTANT: To be sure of the measurement validity, the Joulemeter must have its "calibration check" sticker in current validity.

1- Place the Joulemeter cell in front of the laser beam, at the delivery system output, so that the spot occupies the largest possible part of the sensitive surface.
Do not place it at the focal distance at risk of the cell destruction.

A power straight line should represent the power calibration.

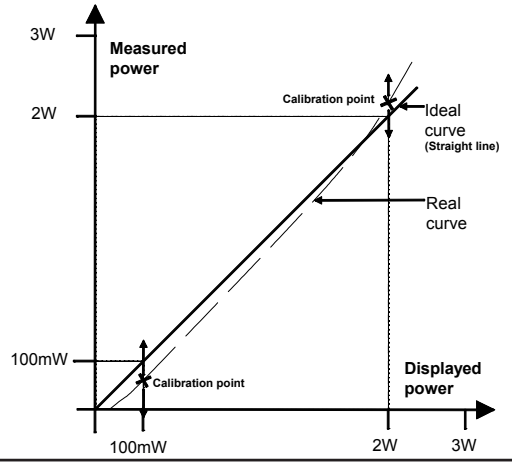
It is possible to modify the 2 points to get a better straight line.

- Check the measured values for the displayed power values:

  400 mW and 1000mW.

Draw the curve:
measured power vs displayed power.

- Do the calibration procedure for the 100 mW and 2W values if necessary to obtain a curve as close as possible to the ideal straight line.



2- Select the first power value with the arrow keys.

3- Protect yourself from the laser reflexions and switch the laser in ready state.
Press the pedal to obtain the measurement.

4- Make an average of 3 measurements (for example).
Note these values; the differences should not exceed 5%.

5- Enter this average.

The setting of a power values is possible in 2 ways:

- Setting with "**+**" and "**-**" buttons.

- Introducing the reading value with the keyboard window accessible by pressing the value area.

6- Select the following power value with the arrow keys and perform the same procedure.
These corrections will then be applied over all the power range by interpolation.

7- To STORE the NEW Calibration value:
- Press the "**OK**" button.
- Press ESCAPE to return to the home page.

6-2-3-2 µPULSE TERMINAL CALIBRATION

This calibration is performed as the continuous calibration (section 6-3).

CAUTION: **To access to the µPulse terminal calibration, it is necessary to:**

- go in "prod" mode by pressing the 330mW power display,

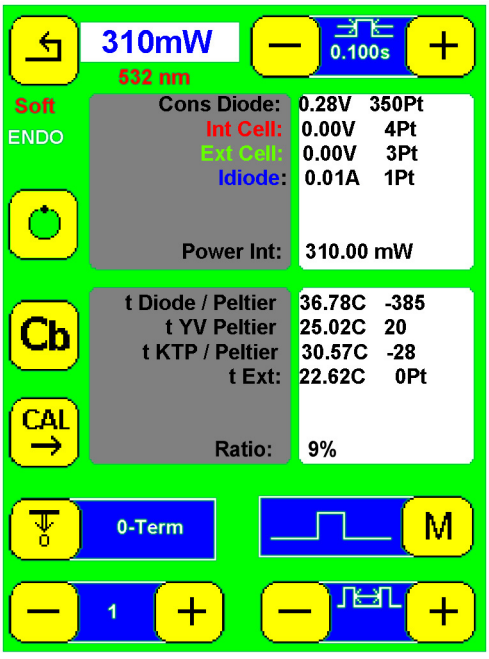
- display the µPulse page (green background) by pressing the shot mode area,

- return to service page (blue background) by pressing the power display.

CAUTION: **An individual calibration must be realized for each connected delivery system.**

Press "**CAL**" button to access to the '**µPulse terminal calibration**' window.

The calibration is made at several power nominal values (selected by the arrow buttons):



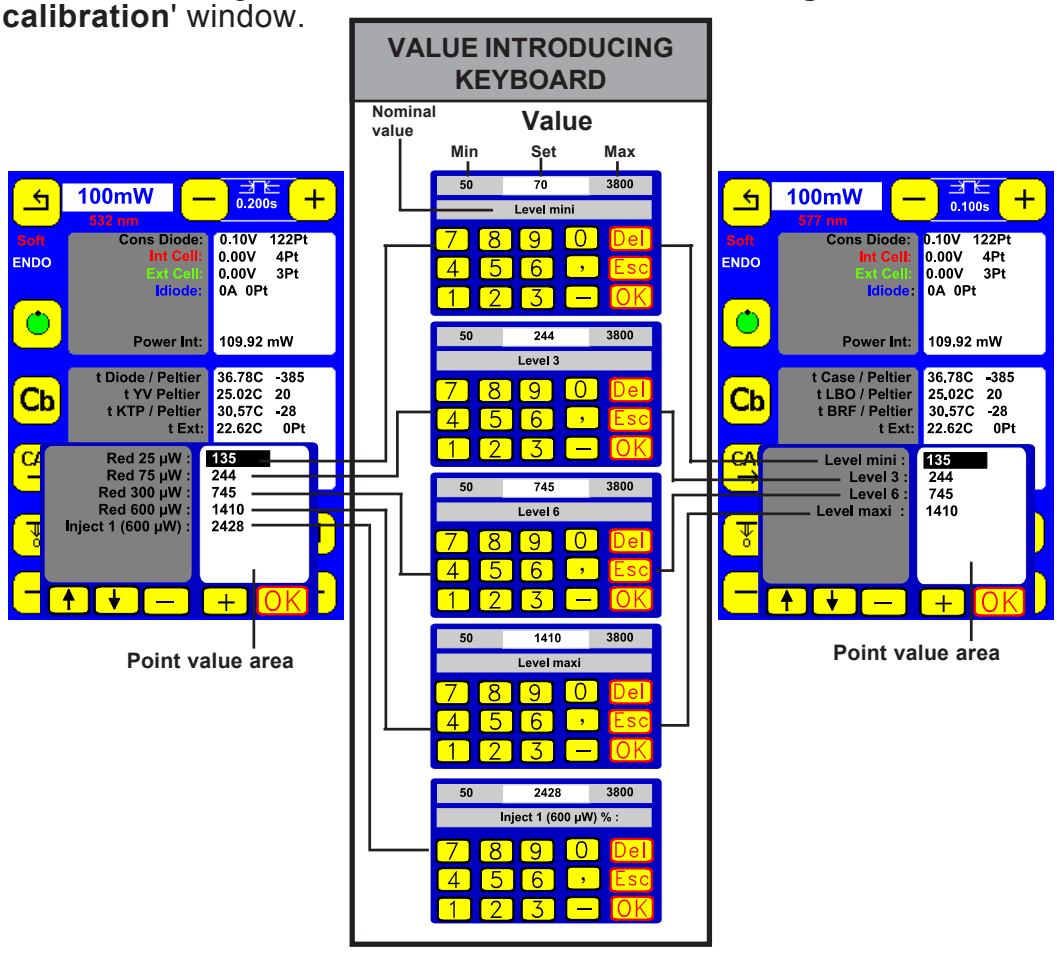
µPULSE TERMINAL CALIBRATION POINTS				
SUPRA 532	SUPRA TWIN 660	810	SUPRA 810	SUPRA 577.Y
100 mW	100 mW	100 mW	100 mW	100 mW
1500 mW	300 mW	1500 mW	1500 mW	1500 mW
-	700 mW	3000 mW	3000 mW	

6-2-5 AIMING BEAM CALIBRATION

To limit the maximal power level of the aiming beam, a single calibration of the aiming beam is realized in manufacturing area. This calibration can be done by a technician on the field if the doctor complains.

A **800 µW maximal power** (with a 200µ optic fiber) must be supplied by the red aiming beam on the output port**.**

Press the aiming number area to access to the '**Aiming beam calibration**' window.



AIMING BEAM CALIBRATION POINTS				
SUPRA 532	SUPRA TWIN 660	SUPRA TWIN 810	SUPRA 810	SUPRA 577.Y
Red 25µW	Red 50µW	Red 50µW	Red 50µW	Level mini (25µW)
Red 75µW	Red 300µW	Red 300µW	Red 300µW	Level 3 (75µW)
Red 300µW	Red 600µW	Red 600µW	Red 600µW	Level 6 (300µW)
Red 600µW	Red 950µW	Red 950µW	Red 950µW	Level maxi (600µW)
Inject 1 (600µW)				

PROCEDURE:

IMPORTANT: To be sure of the measurement validity, the milli-Wattmeter must have its "calibration check" sticker in current validity.

1- Connect an optic fiber (on the port 2 for 532nm cavity).

2- Place the milli-Wattmeter cell in front of the fiber output to measure the aiming beam power.

3- Select each of the calibration points with the arrow buttons.
Set the value to obtain the power required on the milli-Wattmeter.

The setting of power values is possible in 2 ways:

- Setting with "**+**" and "**-**" buttons.

- Introducing the reading value with the keyboard window accessible by pressing the value area.

4- For 532nm cavity, the last calibration point (Inject 1) needs to connect the fiber on the output port 1.
Do the same procedure as above.

5- To store the calibration press "**OK**" button and escape key.

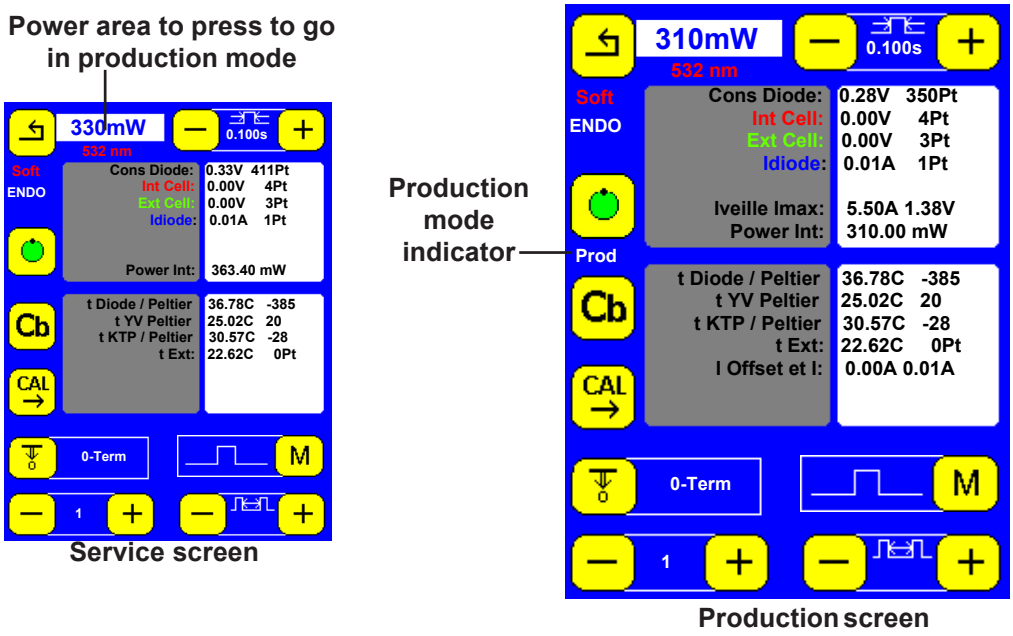
6-3 ADVANCED LEVEL SERVICING

6-3-1 PRODUCTION MODE

IMPORTANT

AFTER EACH USE,
THE INSTRUMENT MUST BE SWITCHED OFF COMPLETLY
BY TURNING THE KEY TO 'OFF' POSITION.

From the sevice treatment page, set the power to **330mW** and press the output power display to enter in "**Prod**" mode.



NOTE: This screen is the service screen with some additional informations in the control areas.

Iveille Imax: Reserved to production use.

Power int: Notice that the internal power is the same than the setting power. The efficiency of the terminal is always 100%.

I offset et I: Reserved to production use

6-3-2 CURVES

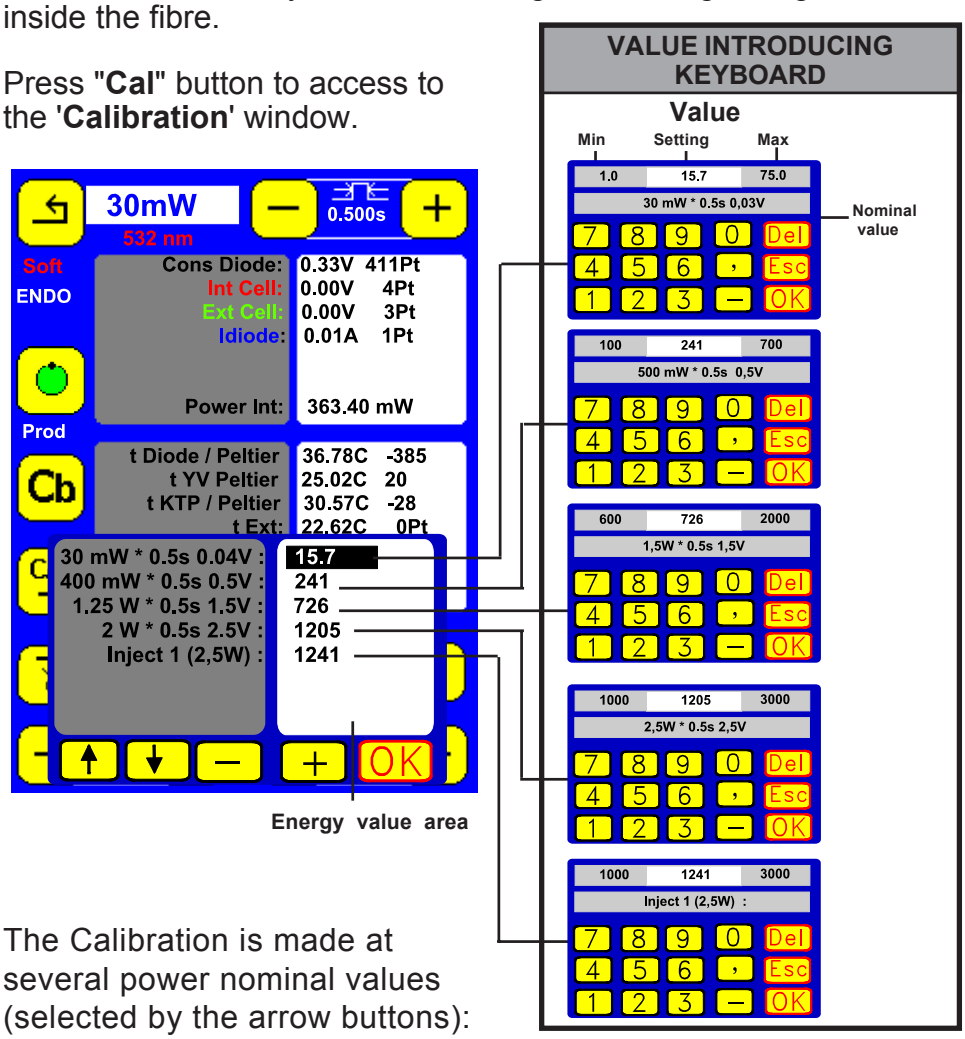
Use the curves, in production mode, like in service mode.
See section 6-2-2 Curves

6-3-3 CAVITY CALIBRATIONS

6-3-3-1 CONTINUOUS CALIBRATION

This is the adjustment of the internal and external cells reading according to an external calorimeter reading.
This calibration must be done with a 90% efficiency fibre connected to the cavity output. It is necessary to perform this calibration with a fiber connected in the way to include during the reading the light reflection inside the fibre.

Press "**Cal**" button to access to the '**Calibration**' window.



The Calibration is made at several power nominal values (selected by the arrow buttons):

CAVITY CONTINUOUS CALIBRATION POINTS				
SUPRA 532	**SUPRA TWIN 660**	**810**	**SUPRA 810**	**SUPRA 577 Y**
30 mW	50 mW	30 mW	30 mW	50 mW
500 mW	130 mW	500 mW	500 mW	500 mW
1,5 W	400 mW	1,5 W	1,5 W	1,5 W
2,5 W	700 mW	2,5 W	2,5 W	2 W
Inject 1 (2,5W)	-	-	-	-

PROCEDURE:

IMPORTANT: To be sure of the measurement validity, the Joulemeter must have its "calibration check" sticker in current validity.

1- Connect an optic fiber:
- 50µm for 532nm laser (on the port 2).
- 50µm for 577nm laser

- 100µm for 660nm laser
- 100µm for 810nm laser

2- Place the Joulemeter cell in front of the fiber output to measure the aiming beam power.

3- Select each of the calibration points with the arrow buttons.
Set the value to obtain the power required on the milli-Joulemeter.

The setting of a power values is possible in 2 ways:

- Setting with "**+**" and "**-**" buttons.

- Introducing the reading value with the keyboard window accessible by pressing the value area.

4- For 532nm cavity, the last calibration point (Inject 1) needs to connect the fiber on the output port 1.
Do the same procedure as above.

5- To store the calibration press on "**OK**" button and escape key.

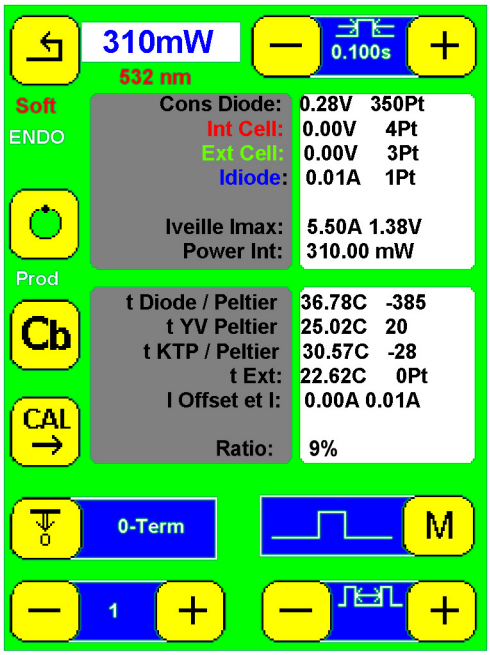
6-3-3-1 µPULSE CAVITY CALIBRATION

This calibration is performed as the continuous cavity calibration.

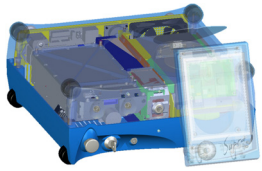
CAUTION: **An individual calibration must be realized for each connected delivery system.**

Display the µPulse page (green background) by pressing the shot mode area from the continuous page (blue background).

Press "**CAL**" button to access to the '**µPulse Terminal calibration**' window.



CAVITY µPULSE CALIBRATION POINTS				
SUPRA 532	SUPRA TWIN 660	810	SUPRA 810	SUPRA 577.Y
100 mW	50 mW	200 mW	200 mW	100 mW
500 mW	250 mW	1 W	1 W	800 mW
1 W	450 mW	2 W	2 W	1,5 W
1,5 W	700 mW	3 W	3 W	2 W



6-3-4 532nm TEMPERATURE MODULATION

The temperatures of the cavity components can be modified by pressing the temperature area.

The temperatures are different between continuous and µPulse mode.

They are adjusted in production area in the way to obtain a curve profile as stable as possible on the full range of powers.

NEVER modify these temperatures before having advised the service department in QUANTEL MEDICAL. Modification of these temperatures can be necessary in case of unstable curves profile after transport, or evolution of the optical component characteristics which produce some current peaks influencing the cell stability.

Temp diode: This is the diode temperature which is adjusted in production area according to the supplier specifications in the way to optimise its efficiency and its wavelength compatibility with the cristal.

The diode temperature setting have a direct effect on the current consummation. That means that moving away from this manufacturing temperature gives a risk of current saturation at high powers.

Recommended incrementation during adjustment is **3°C**.
The range of adjustment is between **15 and 40°C**.

Temp YV: This is the cristal temperature.

In case of current peaks, increase the temperature will move the peak later in the exposure and decrease the temperature will approach the peak to the begining of the shot.
The target will be first to reduce the peak intensity and then to move the residual peak at the very begining of the shot to form an overshoot.

Recommended incrementation during adjustment is **1°C**.
The range of adjustment is between **15 and 40°C**.

Temp KTP: This is the frequency doubled cristal temperature. It is the most sensible adjustment.

Recommended incrementation during adjustment is **0,2°C**. The target of this adjustment will be to eliminate the current peak. The range is between **15°C and 40°C**.

6-3-5 577NM TEMPERATURE MODULATION

The component temperature are set by the manufacturer and are not accessible.

6-3-6 OTHER PARAMETERS

Power security checks:
This window is accessible by pressing on the aiming beam value area. This part is only used in production area to check the correct functioning of the power securities.

Iveille / I max:
This window is accessible by pressing the upper square of the screen.
The I mini is inhibited at the exit of production area.
The I maxi is used only in production area.

6-4 SERVICE STATISTICS ON THE LASER USE

From the home page in SAV mode press SUPRA logo until to display the following page:

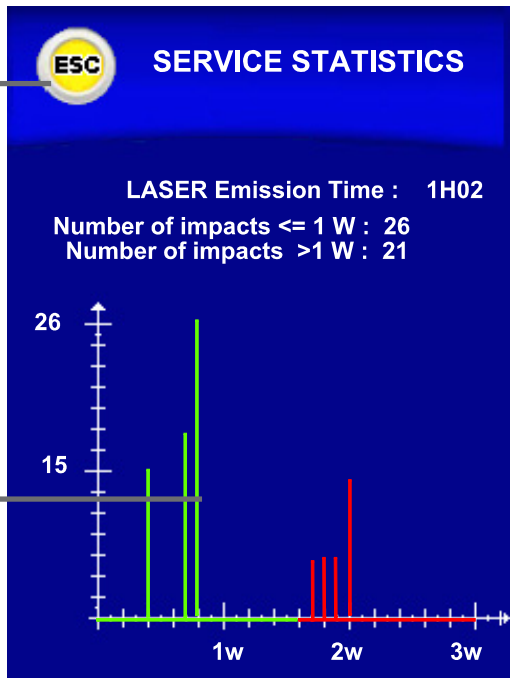
- The cumulated time during which the laser beam has been emitted.

- The number of impacts up to the middle power (green color).
- The number of impacts above the middle power (red color).

MIDDLE POWER VALUE				
SUPRA 532	SUPRA TWIN 660	810	SUPRA 810	SUPRA 577.Y
1800 mW	450 mW	1800 mW	1800 mW	1 W

To EXIT

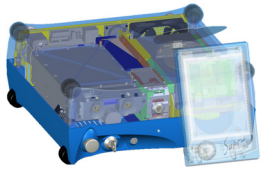
Statistic graph showing the impact number for each power used.



To reset the statistics press the title area "SERVICE STATISTICS".
The doctor statistics are reseted at the same time.

7

WARNING AND ERROR MESSAGES



7 WARNING AND ERROR MESSAGES

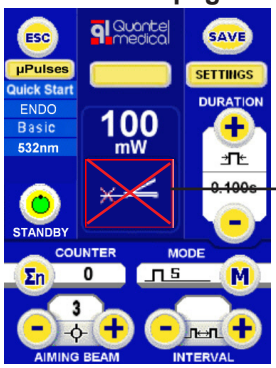
WARNINGS

The warning messages are materialized on the screen by an icon and it appears under the power display.

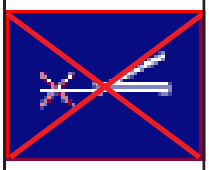
These messages appear in treatment page of the doctor mode

They are not an error message but they disable the laser shot by switching the laser in STANBY mode.

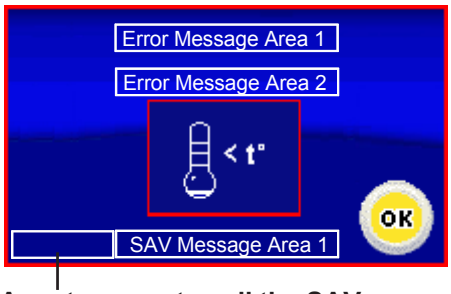
Treatment page



Warning displaying area

ICONS	*MESSAGES*	*CAUSES*	*ACTIONS*
	Remote interlock	The remote is open or is improperly closed (door or other safety device)	**- Close the remote.** **- Verify the remote control connection situated at the back of the unit.**
	Pedal pressed	The footswitch is pressed while in the STANDBY mode: It could be a short-circuit:	**- Release the footswitch.** **- Disconnect the footswitch and check that the message disappears.**
	Pedal not connected	The footswitch is not recognized.	**- Check the footswitch connection at the back of the device.**
	Doctor filter not connected / positioned	The doctor filter is not recognized:	**- Check the filter position.** **- Check the filter connection on the front panel.**
	Low power	The laser has power loss.	**- Call service.**

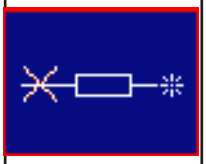
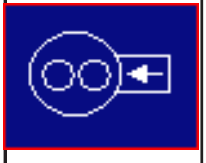
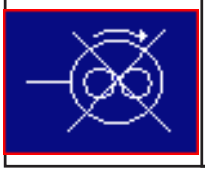
DEFAULTS

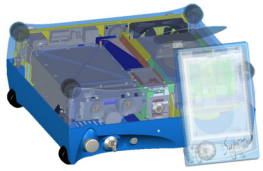


Area to press to call the SAV messages

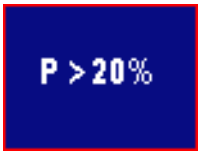
To have more informations on the error displayed press the left angle of the error window.
The SAV message appears under the error icon.

It is possible to view the laser software progressing until the default appearance with Quantelprog software and the laser connected to a PC computer.
It gives an additional accuracy of the diagnosis.

MESSAGES & ICONS	SAV MESSAGES	CAUSES	ACTIONS
Footswitch error	Error	The footswitch is pressed outside the treatment page: It could be a short-circuit:	**- Release the footswitch** **- Disconnect the footswitch and check that the message disappears.**
Fiber disconnected 	Fiber disconnected	The terminal of the delivery system is not connected or has a bad connection:	**- Disconnect and re-connect the fiber to force the detection by pushing it more.** **- Check the fiber detection switches.**
Filter Position 	Filter 1	Manual filter disconnected or wrong positionned.	**- Check the front panel connector or remote is well fitted.** **- Check the detection position switches of the filter.**
Filter Position 	Filter 2	Motorised filter not connected or not well functioning. Remote filter not connected.	**- Check filter position cell inside the filter.** **- Check connections of the filter or the remote.**



7 WARNING AND ERROR MESSAGES

ICONS	MESSAGES	SAV MESSAGES	CAUSES	ACTIONS
	Call Service Hard P>20%	Hard P>20%	A cell have detected a value of P outside the limits or is misfunctionning or is uncalibrated	**Perform the cavity calibration (§6-3-3) and try to fire again.** **- If current unstable, adjust component temperatures.** **- If the deviation between cells is too high, adjust P2 on cavity board to reduce the deviation.** **Call Service**
	Call Service Soft P>20%	Cell Int Soft P> 20% Cell Ext Soft P> 20%		
	Call Service Hard P<20%	Hard P<20%		
	Call Service Soft P<20%	Cell Int Soft P< 20% Cell Ext Soft P< 20%		
	Call Service Hard P<50%	Hard P<50%		
	Call Service Soft P<50%	Cell Int Soft P< 50% Cell Ext Soft P< 50%		
	Temperature	Temp Ext	External temperature outside the functionning range. After extended use the laser may over heat.	**- The instrument must only be used within the acceptable temperature range:** **SUPRA & TWIN 10°C to 35°C (50°F to 95°F)** **SUPRA 577-Y 15°C to 30°C (50°F to 86°F)** **- Let it cool down for a few minutes.**
		Peltier Regul	The temperature is not stabilised by the Peltier system.	**Wait a few seconds and try to fire again. Measure the 3 Peltier voltages to identify which one is damaged.**
		Diode Regul 532nm KTP Regul Yv Regul CASE Regul 577nm BRF Regul LBO Regul	The signal from the respective component thermistor is not correct.	**Check the voltage on the respective component test point on the:** **532nm cavity board:** **Diode: TP2** **KTP: TP1** **Yv: TP3** **577nm interface board:** **CASE: TP2** **BRF: TP1** **LBO: TP3** **Measure:** **20°C = 3.2V** **Δ°C = 0.1V/°C**
		Diode Connect 532nm KTP Connect Yv Connect CASE Connect 577nm BRF Connect LBO Connect	No signal come from the component thermistor.	

WARNING AND ERROR MESSAGES

ICONS	MESSAGES	SAV MESSAGES	CAUSES	ACTIONS
	Call Service Shutter 1	Shutter 1	All conditions are not ready for firing.	**Press OK and try again. Replace the Power board. - Call Service.**
	Call Service Shutter 2	Shutter 2		
	Call Service Security: #	Security: #		**Note the security number. - Call Service.**
	Call Service Hard Shoot	Hard Shoot Soft Shoot End	Firing is stopped by a hard signal error.	**Try again to fire and note the error alarm just before the hard shoot message. - Call Service.**
	Call Service Power Supply	Power Supply	Power supply missing.	**Check Power supply block. - Call Service**
	Init Error Error	Error	Wrong initialization of the CPU.	**Check the connections between CPU and Power board. Check the power supply. - Call Service.**
	Current Error Error	Error	Software detects current over: 9A (532nm) 25A (577nm) delivered to the diode.	**Check calibrations. Replace Power board. - Call Service.**
	Power detected	Power detected	A cell reads a light when the laser is in standby mode.	**Check the cell offset values on the cavity board.**

CALIBRATION ERROR MESSAGE:

LASER NOT CALIBRATED:

The message appears in red in the lower left-hand part of the screen.

'cavity 532nm and 810nm not calibrated
start service mode'

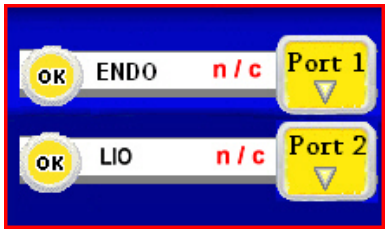
The laser cavity is not calibrated: *** See section 6-3-3 *.**

TERMINAL NOT CALIBRATED:

A red message appears on the same line of the terminal displayed in the terminal/port selection window.

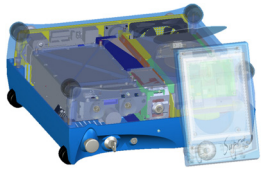
'n / c'

The terminal is not calibrated: *** See section 6-2-3 ***



8

DIAGNOSIS



8-1 PERFECT LASER

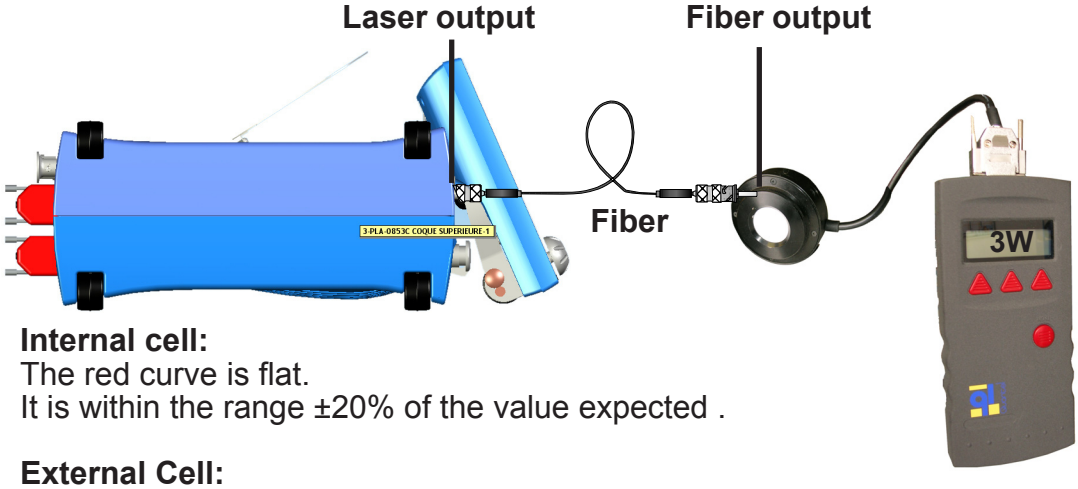
Conditions to have a perfect laser:

To obtain this curve, set up the laser to:

Mode:	**SAV**
Port for 532nm:	**2**
Terminal:	**Endo**
Power:	**see table**
Exposure time:	**0,3s**
Mode:	**Single**
Calibration:	**90%**

Delivery system output: fiber with 90% efficiency minimum.

POWER VALUE			
	LASER OUTPUT	**FIBER OUTPUT**	**FIBER**
SUPRA 532	3,5 W	3 W	50µ
SUPRA TWIN 660	mW	mW	100µ
SUPRA TWIN 810 **SUPRA T810**	3,5 W	3 W	100µ
SUPRA 577.Y	2,2 W	2 W	50µ



Internal cell:
The red curve is flat.
It is within the range ±20% of the value expected .

External Cell:
The green curve is superimposed with the red curve.
The deviation between the two curves is within ±5%.

Diode current:
The blue curve presents a peak at its begining and decreases until to have quickly a flat part .
It presents no peak after the begining peak.

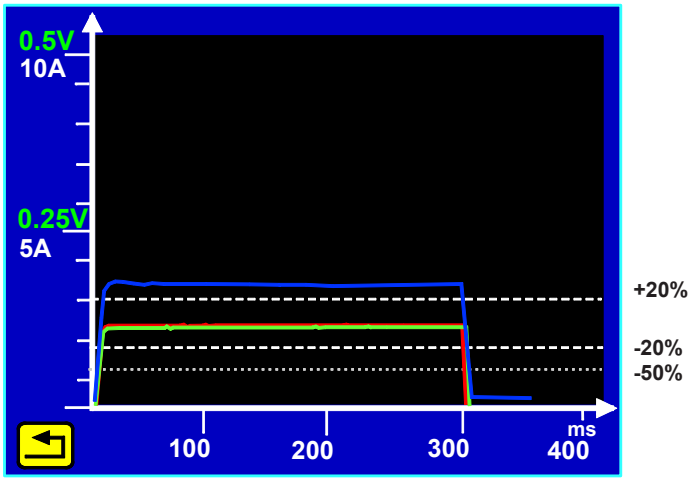
Some curve examples are illustrated in chapter 8-2 corret curves.

8-2 CORRECT CURVES (Examples)

Laser curve window ('**Cb**' button)

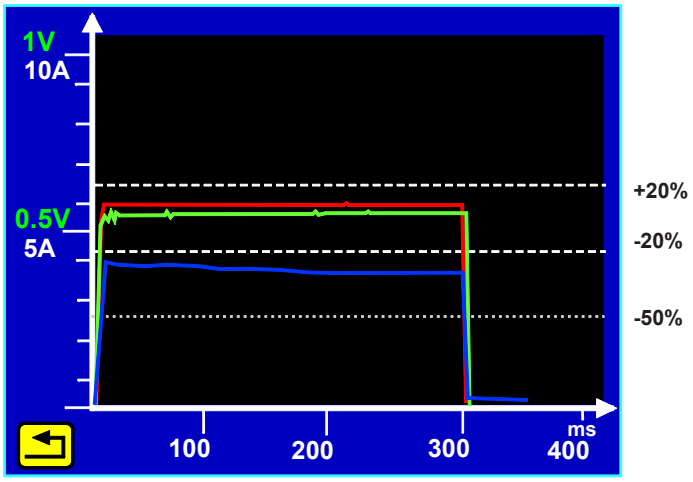
Internal cell:
The red curve must be as flat as possible.
It must be within the range ±20% and it must not present peeks too high.

Power: 100mW Exposure: 300ms



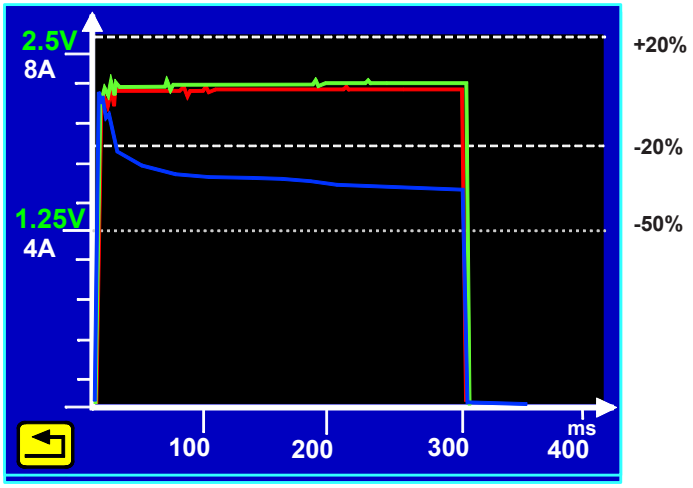
External Cell:
The green curve must follow the red curve so near as possible with a maximum of ±5% of deviation.

Power: 500mW Exposure: 300ms



Diode current:
The blue curve presents a peak at its begining and decreases until to have quickly a flat part .
It must present any peak after the begining peak.

Power: 2W Exposure: 200ms



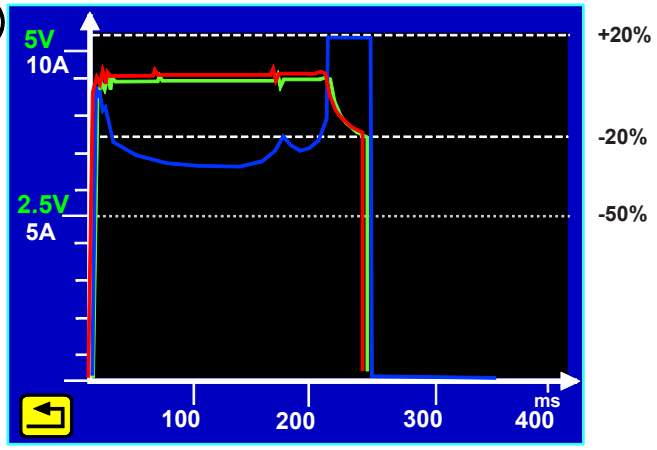
8-3 FAULTY CURVES

For the example here under,the solution will be to modify the optical component temperature (see chapter 6-3-4).

1 **Diode current:**
The current (blue curve) increases until to the saturated value (hard defect at Imax).

Cell curves:
The red and green curves go below the -20% and -50% security limits.
It causes the laser stopping and displays an error message.

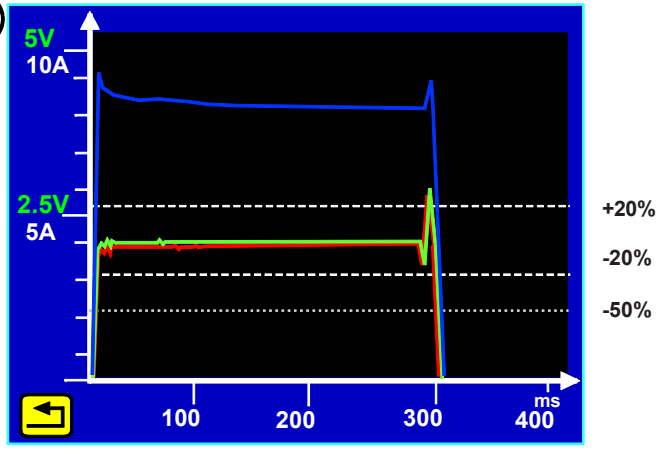
1



2 **Diode current:**
The blue curve has a peak.

Cell curves:
The red and green curves follow the current peak and they go above the +20% security limit.
It causes the laser stopping and displays an error message.

2

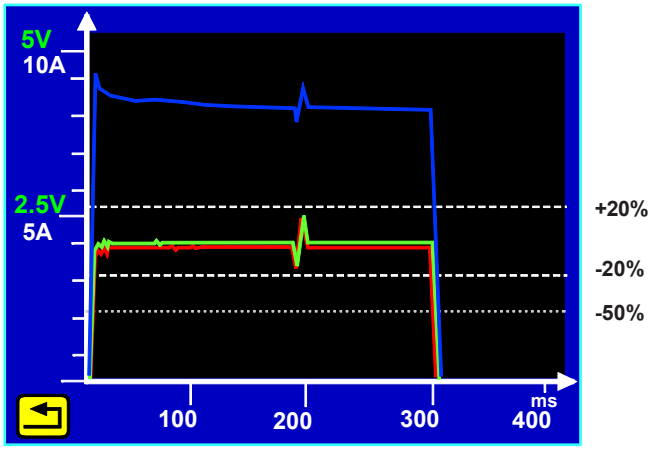


3 **Diode current:**
The blue curve has a little peak.

Cell curves:
The red and green curves follow the current peak but they stay wiyhin the ±20% security limits.
The laser does not shutdown.

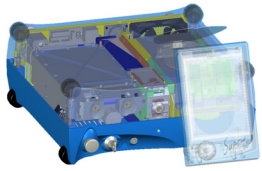
This case must be followed.

3



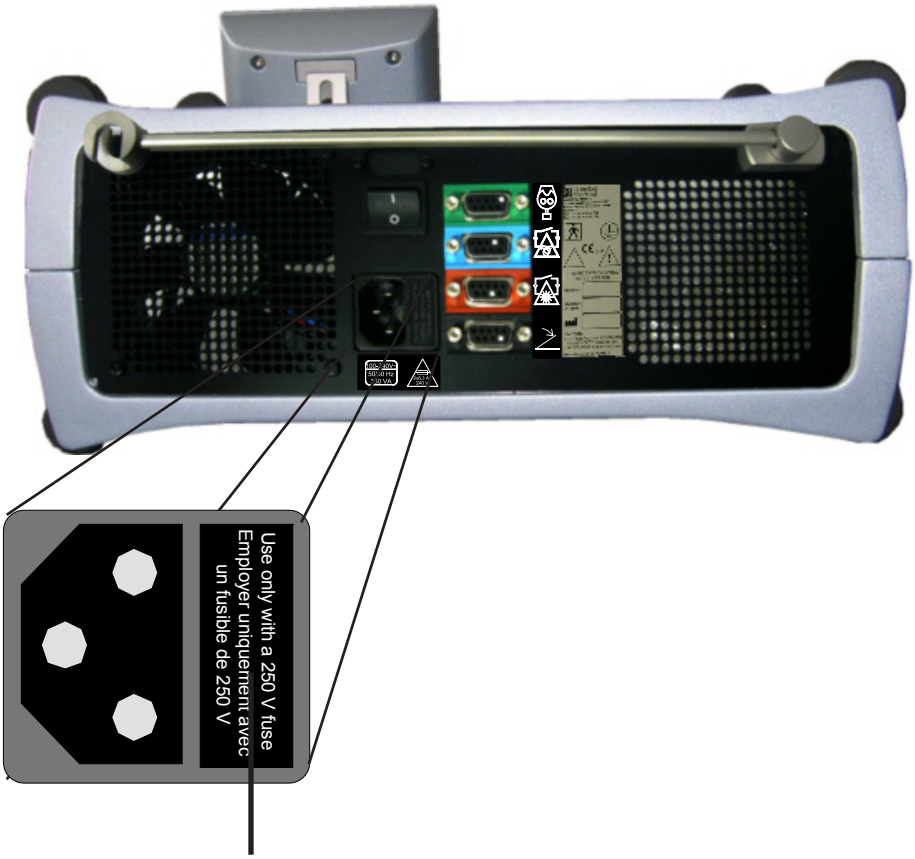
9

FUSE REPLACEMENT



FUSE REPLACEMENT

- Disconnect the power cord before any intervention on the instrument.



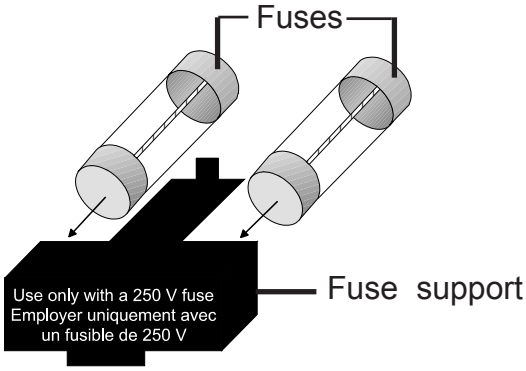
- With a screwdriver pull the main fuse block at the rear of the machine.

- Remove the fuse support and change the fuses if necessary.

Fuse specifications: Glass fuse
5 x 20mm

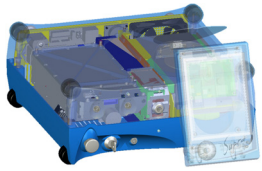
6,5AT 250V (**SUPRA** & **SUPRA TWIN**)

6,3AT 250V (**SUPRA 577.Y**)



10

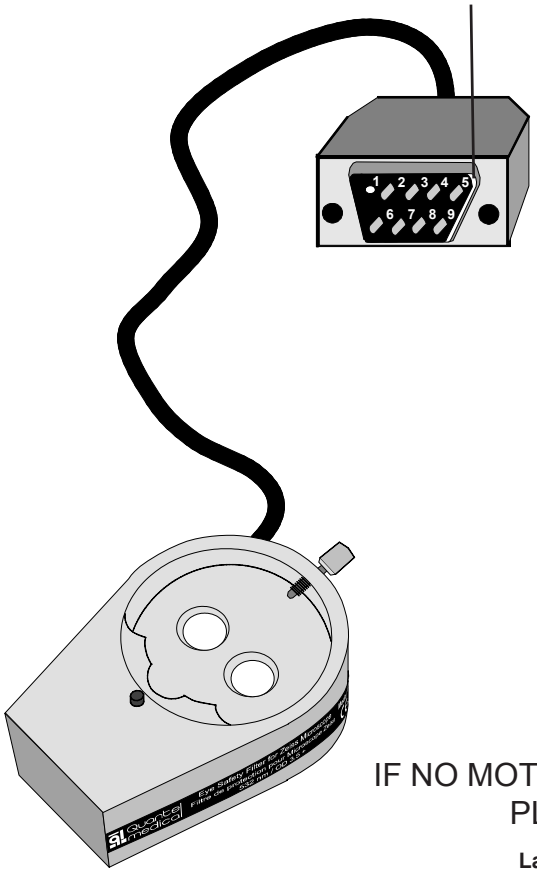
REAR PANEL PLUGS



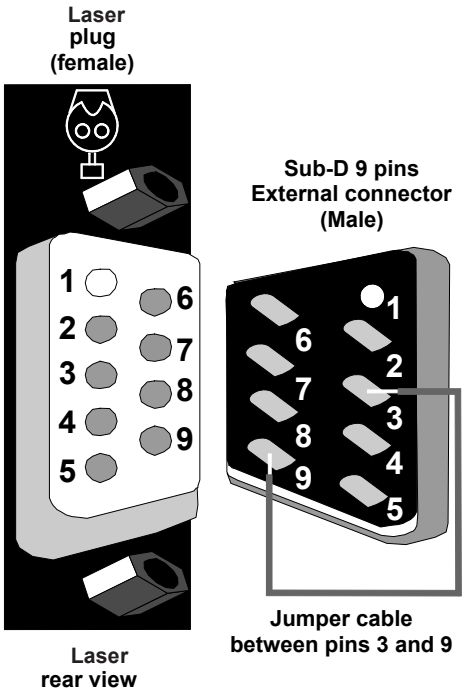
REAR PANEL PLUGS

10-1 MOTORIZED FILTER PLUG (GREEN)

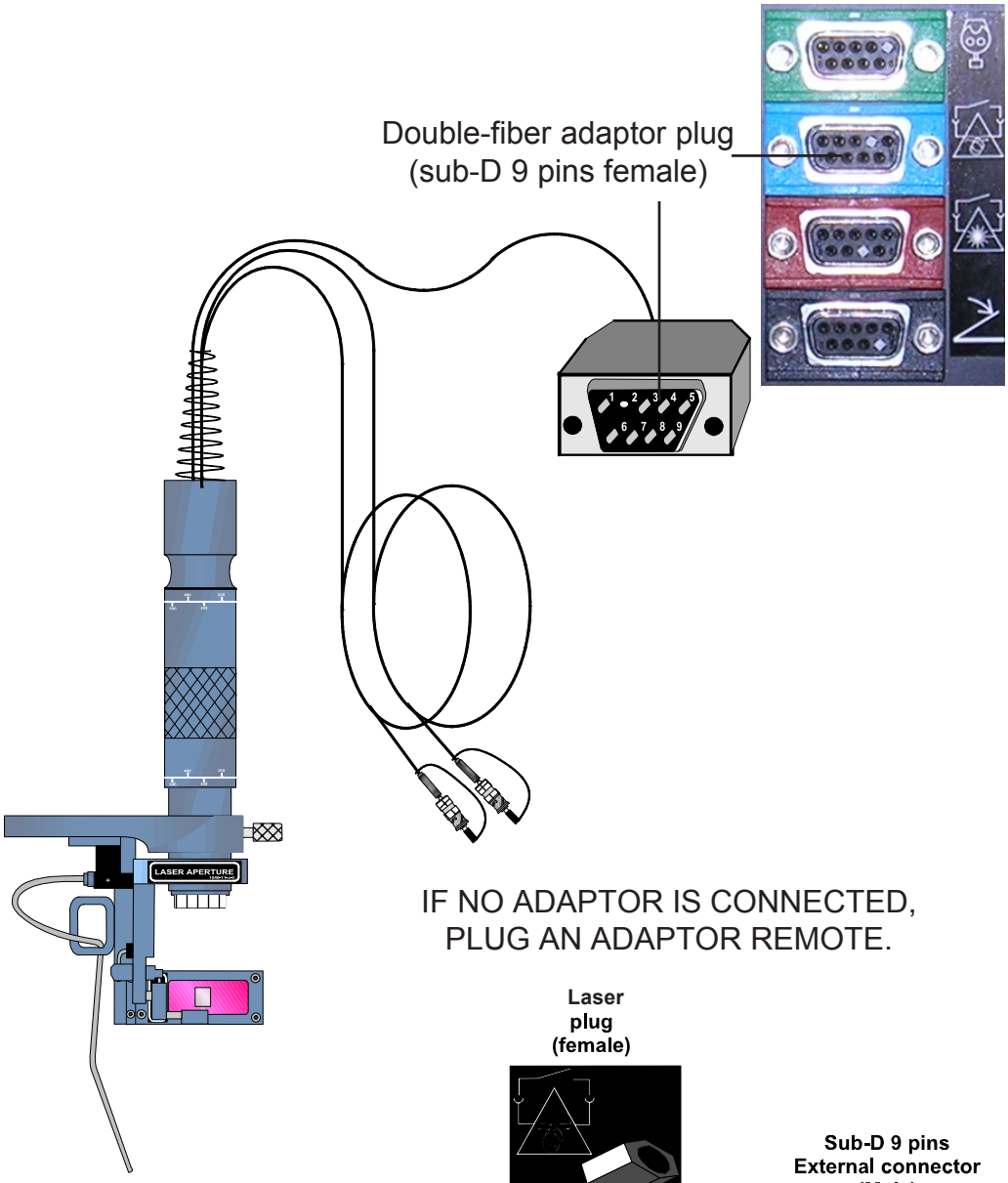
Motorized filter plug
(sub-D 9 pins female)



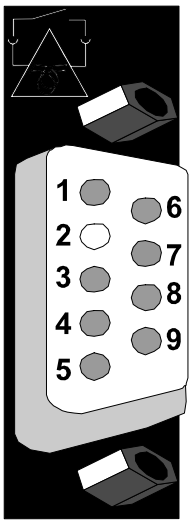
IF NO MOTORIZED FILTER IS CONNECTED,
PLUG A FILTER REMOTE.

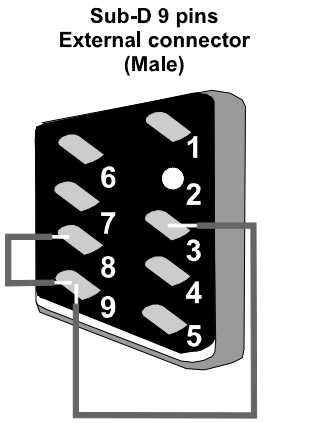


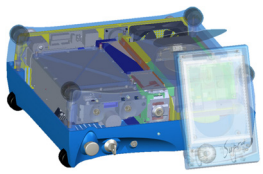
10-2 DOUBLE-FIBER ADAPTOR PLUG (BLUE)



IF NO ADAPTOR IS CONNECTED,
PLUG AN ADAPTOR REMOTE.

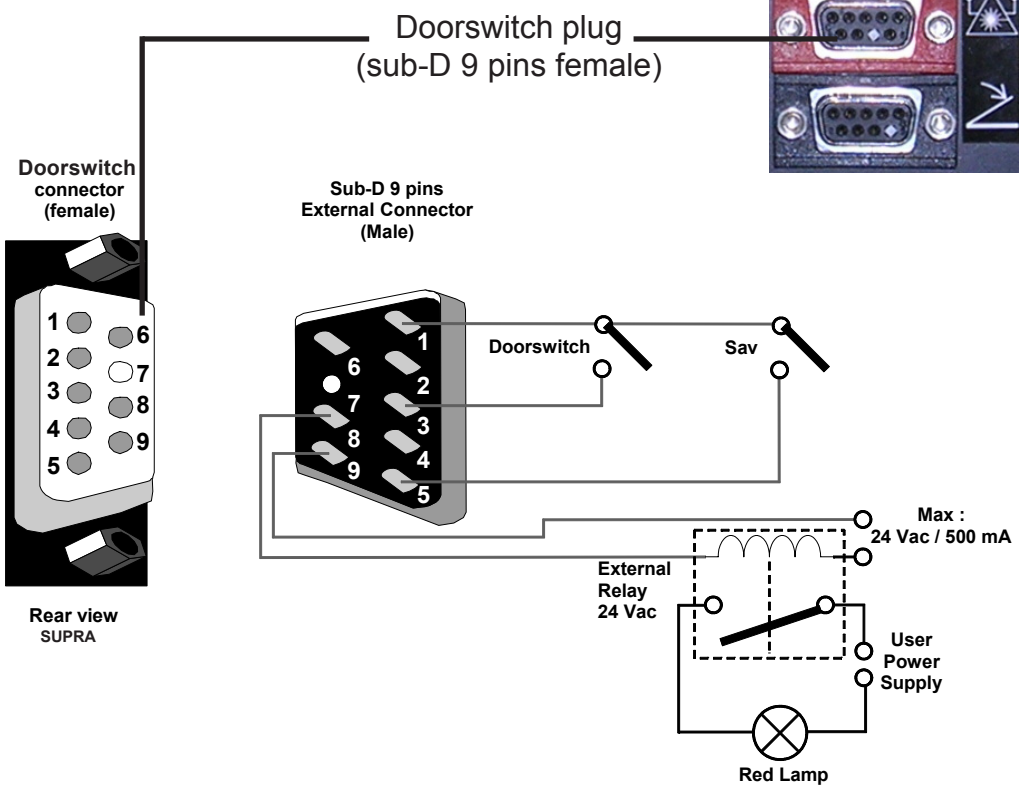




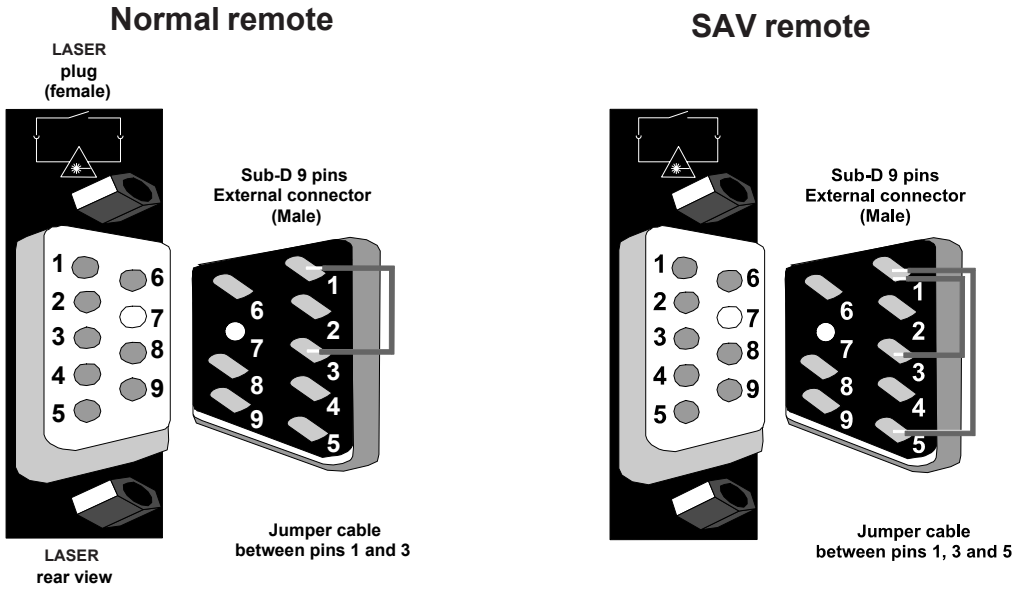


REAR PANEL PLUGS

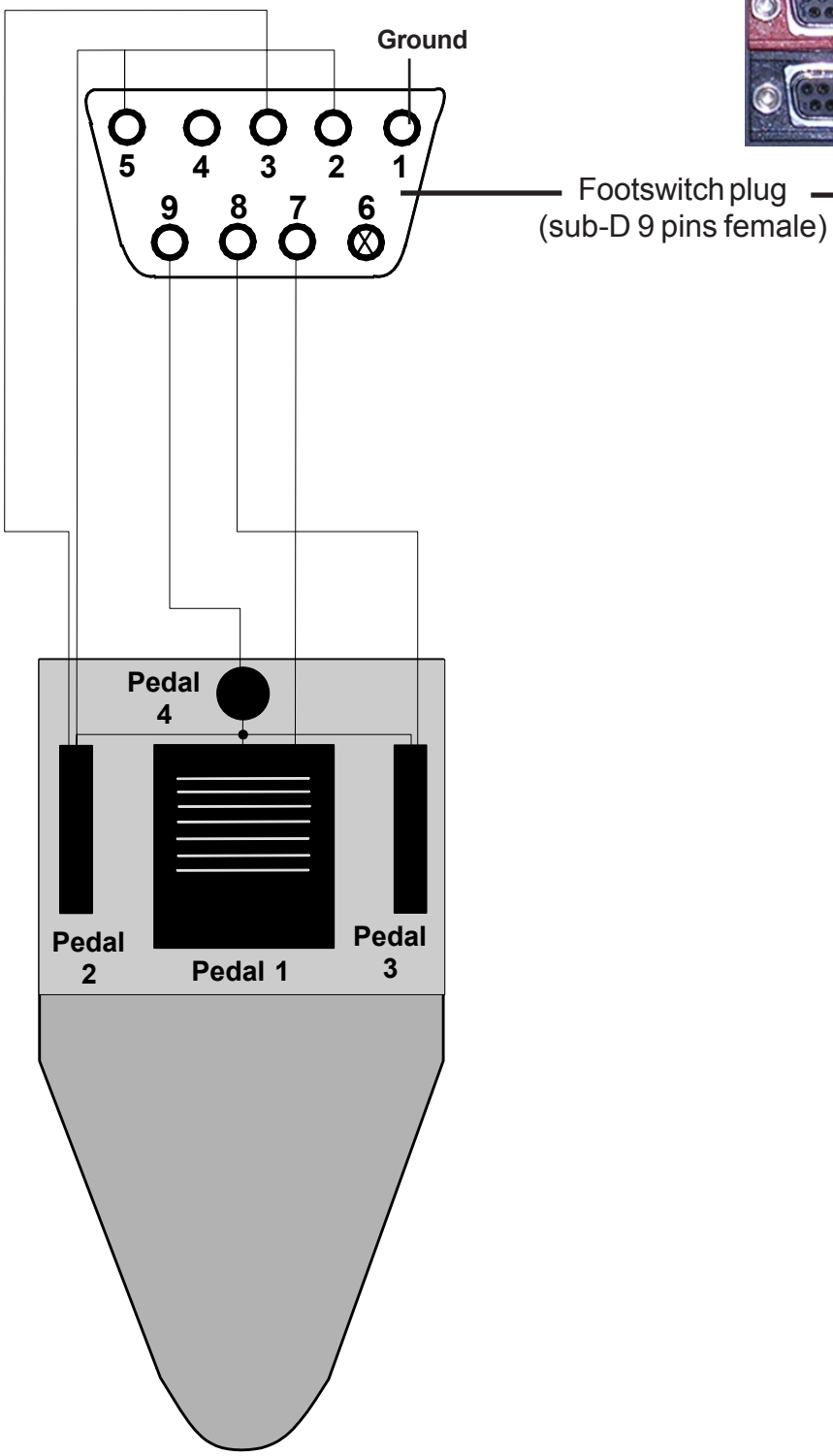
10-3 DOORSWITCH PLUG (RED)

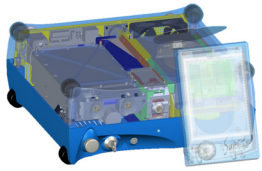


IF NO DOORSWITCH IS CONNECTED, PLUG AN EXTERNAL REMOTE.



10-4 FOOTSWITCH PLUG (BLACK)





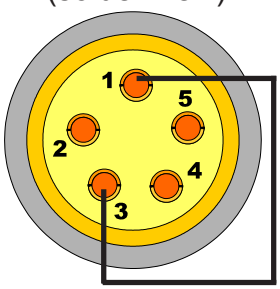
10-5 FRONT FILTER PLUG

Front filter
remote connector

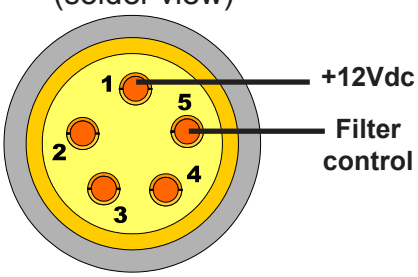
Filter Plug
on LASER front panel

IF NO FRONT FILTER OR LAMP CONNECTOR IS CONNECTED,
PLUG A FILTER REMOTE.

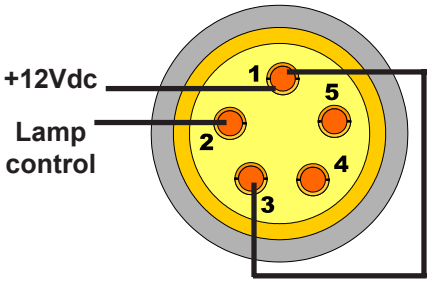
Remote wiring
(solder view)



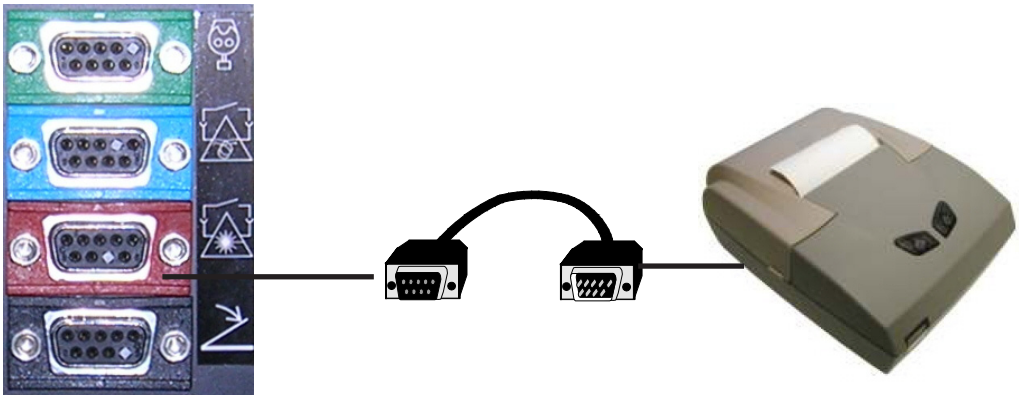
Front filter wiring
(solder view)



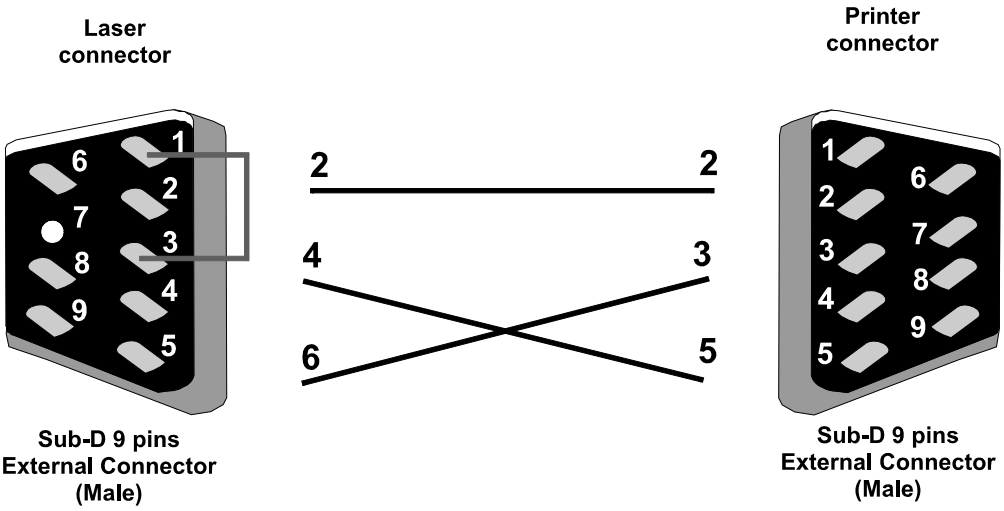
Lamp wiring
(solder view)

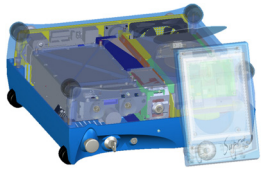


10-6 PRINTER CABLE



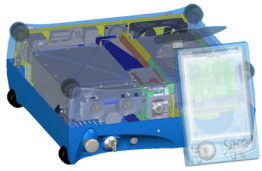
Printer cable





11

SOFTWARE INSTALLATION



11 SOFTWARE INSTALLATION

IMPORTANT

HOWEVER
AFTER SOFTWARE INSTALLATION YOU HAVE TO CHECK THE CALIBRATION BEFORE ANY USE OF THE LASER.

11-1 PRELIMINARY OPERATIONS

IMPORTANT: The calibration data can be erased from the laser memory during the upgrade process.

NOTE CARREFULLY
THE LASER CALIBRATION DATA
IN THE WAY TO REFILL THE MEMORY AFTER UPGRADE.

Note the following values:

Continuous terminal calibration	µPulse terminal calibration
Aiming calibration	
Continuous cavity calibration	µPulse cavity calibration
Component temperature	
User data	

These data can be read from the laser memory with Quantelprog software:

- Connect the laser to the PC computer as indicated in section 11-2-1.

- Run Quantelprog software on PC computer.

- Set the software parameter as indicated in section 11-2-2 except for the auto stop tick box which must be unticked.

- Start the laser and wait the home page display.

- Enter the command :
  - "f" to list the 532nm laser setup.
  - "F" to list the option laser setup.
  - "h" to list the doctor folder data.

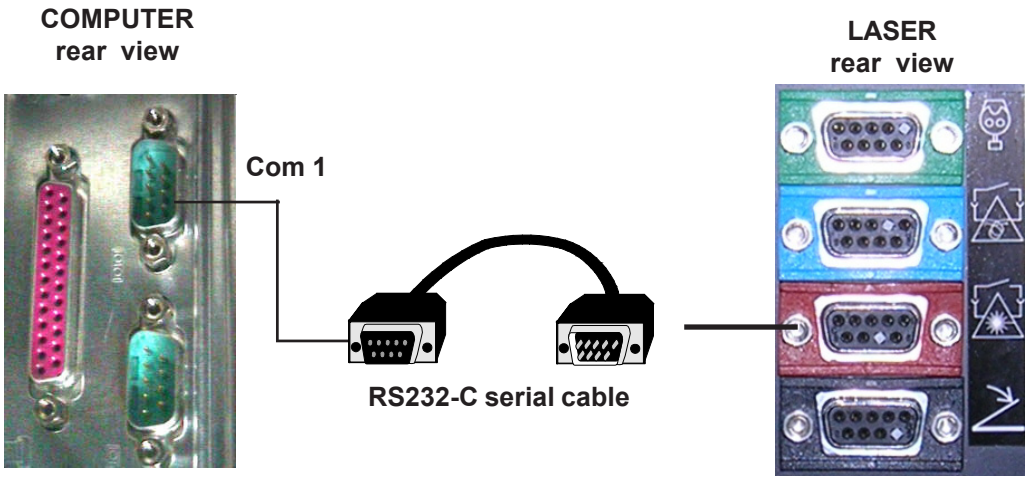
- Print or save the data displayed.

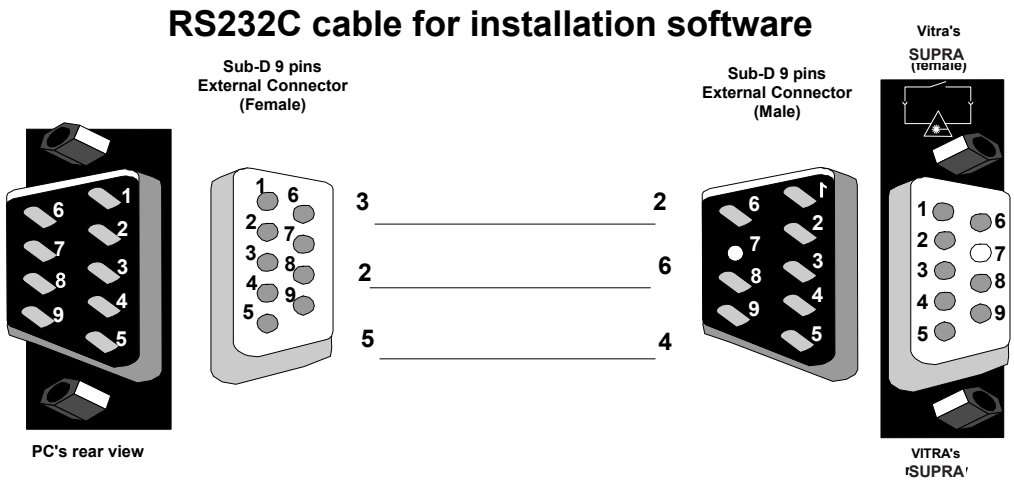
NOTE: To save the data, select, copy and past them in a text editor and save the file.

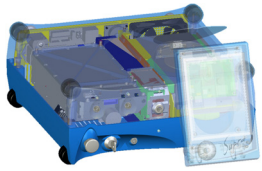
11-2 PREPARATION

11-2-1 CONNECTION

- Connect the PC's COM1 port to the laser remote connector using a specific serial cable.







EXAMPLE OF LASER SETUP (KEY "f" or "F")

_____ 532 SETUP _____

Temp. component

TEMPERATURES
En continu: Temp diode :39.20C, Temp YV: 25.00C Temp KTP: 28.00C
En uPulse: Temp diode :41.00C, Temp YV: 25.00C Temp KTP: 28.00C

IMIN IMAX
En Continu: Imin :5.78A, Imax: 1.46V
En uPulse : Imin :5.78A, Imax: 1.50V

TPS DE MONTEE ET DE DESCENTE
Waitdetect :5 Ms, WaitRise: 6 Ms WaitEnd: 2 Ms

Continuous cavity calibration

CALIB CAVITE CONTINU
Points calibration Cavite continue
Pt1: 0.03V - 0014mW
Pt2: 0.50V - 0245mW
Pt3: 1.50V - 0746mW
Pt4: 2.50V - 1231mW
Points calibration Cavite continue Cell EXT
Pt1: 0026Pt
Pt2: 0471Pt
Pt3: 1411P
Pt4: 2332Pt
Points calibration Cavite continue Cell INT
Pt1: 0037Pt
Pt2: 0608Pt
Pt3: 1824Pt
Pt4: 3041Pt

Inject 1

Points calibration Cavite continue Coeff Inj 1: 100.00 Pourcent soit la valeur: 1231.00pt

µPulse cavity calibration

CALIB CAVITE uPULSE
Points calibration Cavite uPulse
Pt1: 0.20V - 0009mW
Pt2: 1.00V - 0045mW
Pt3: 2.00V - 0090mW
Pt4: 3.00V - 0132mW
Points calibration Cavite uPulse Cell EXT
Pt1: 0087Pt
Pt2: 0464Pt
Pt3: 0935Pt
Pt4: 1357Pt
Points calibration Cavite uPulse Cell INT
Pt1: 0116Pt
Pt2: 0598Pt
Pt3: 1207Pt
Pt4: 1756Pt

Valim Shoot1 2.30 Shoot2 2.30 et shoot3 2.40

Continuous terminal calibration

CALIB SAV Continu
Calib term MICRO Pt1: 0100mW -> 0018mW Pt2: 2000mW -> 0362mW
Calib term ENDO Pt1: 0100mW -> 0018mW Pt2: 2000mW -> 0362mW
Calib term LIO Pt1: 0100mW -> 0018mW Pt2: 2000mW -> 0362mW
Calib term S/L Pt1: 0100mW -> 0018mW Pt2: 2000mW -> 0362mW
Calib term PHOTON Pt1: 0100mW -> 0018mW Pt2: 2000mW -> 0362mW

µPulse terminal calibration

CALIB SAV MicroPulse
Calib term MICRO Pt1: 0100mW -> 0008mW Pt2: 1500mW -> 0132mW
Calib term ENDO Pt1: 0100mW -> 0004mW Pt2: 1500mW -> 0100mW
Calib term LIO Pt1: 0100mW -> 0008mW Pt2: 1500mW -> 0132mW
Calib term S/L Pt1: 0100mW -> 0008mW Pt2: 1500mW -> 0132mW
Calib term PHOTON Pt1: 0100mW -> 0008mW Pt2: 1500mW -> 0132mW

Aiming calibration

calibration du rouge: Cons 50uW :1100Pt Cons 150uW: 1400Pt Cons 300uW: 1800Pt
Cons 600uW 2200Pt
Coef: 1.00 Pourcent

DIVERS
Sauvegarde position Fibre 2

Doctor terminal calibration

CALIB Doctor
Term MICRO : calib doc 500mw: 500.00mW
Term ENDO : calib doc 500mw: 500.00mW
Term LIO : calib doc 500mw: 500.00mW
Term S/L : calib doc 500mw: 500.00mW
Term PHOTON : calib doc 500mw: 500.00mW

EXAMPLE OF DOCTOR SETUP (KEY "h")

Quick start setup

USER QuickStart
Procedure: QuickStart
Term S/L
Wave 532
Mode:Single
Exop:0.300s
Repeat:0.10s
Volume: 11
Footswitch: BASIC +
Voice:0
Power:260mW
AimingBean:3
****

User 1 Procedure 1

USER PAUFI
Procedure:RETINA
Term S/L
Wave 532
Mode:Single
Exop:0.100s
Repeat:0.10s
Volume: 3
Footswitch: BASIC +
Voice:23
Power:100mW
AimingBean:0
****

User 1 Procedure 2

USER PAUFI
Procedure:PA2
Term ENDO
Wave 532
Mode:Single
Exop:0.100s
Repeat:0.10s
Volume: 11
Footswitch: BASIC
Voice:0
Power:100mW
AimingBean:3
****

User 2 Procedure 1

USER FLOY
Procedure:FL1
Term LIO
Wave 532
Mode:Single
Exop:0.100s
Repeat:0.10s
Volume: 11
Footswitch: BASIC
Voice:0
Power:100mW
AimingBean:3
****

User 3 Procedure 1

USER ETOU
Procedure:ET1
Term MICRO
Wave 532
Mode:Single
Exop:0.100s
Repeat:0.10s
Volume: 11
Footswitch: BASIC
Voice:0
Power:100mW
AimingBean:3
****

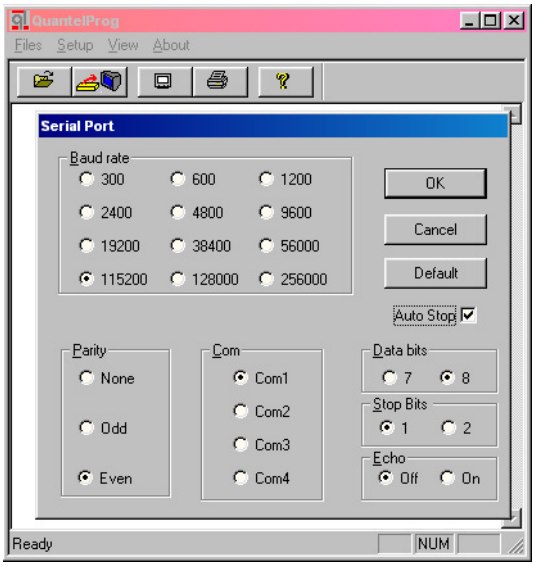
User 4 Procedure 1

USER ADEH
Procedure:AD1
Term PHOTON
Wave 532
Mode:Single
Exop:0.100s
Repeat:0.10s
Volume: 11
Footswitch: BASIC
Voice:0
Power:100mW
AimingBean:3

11-2-2 CONFIGURATION AND SOFTWARE PATH

The quantelprog software is needed to install a new firmware version on devices.

1- Open the Quantelprog software.

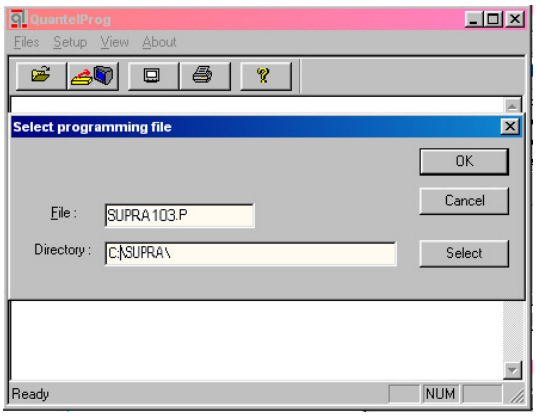


2- Press '**F9**' key or click on "**Setup**" menu to set the software parameter.

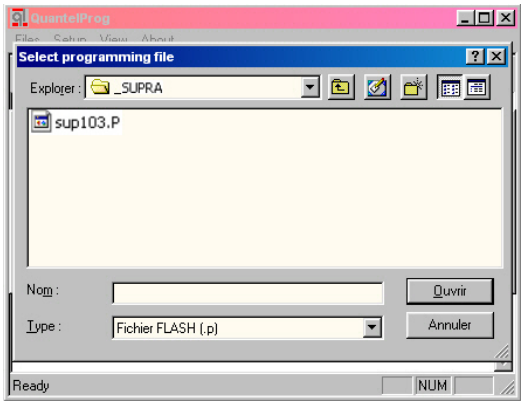
Click on '**Default**' button to have the good configuration.

3 - Find and select the software to load:

Click on '**Open**' icon, and find the software location.



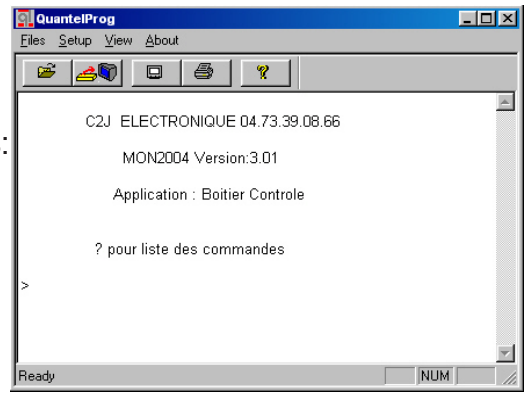
The software has an extension "**.p**"



11-3 DOWNLOADING SUPRA SOFTWARE

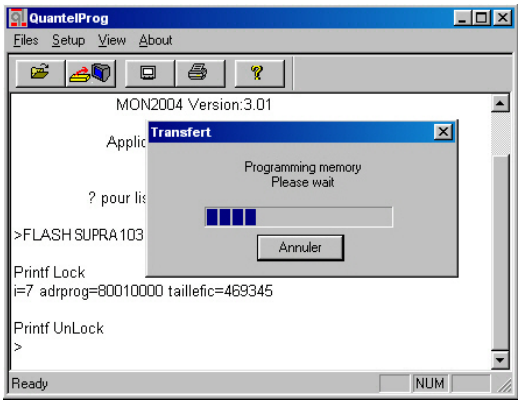
1- Start the laser.

The '**Quantelprog**' software displays:



2- Click on the downloading icon:

A control box displays the downloading evolution.

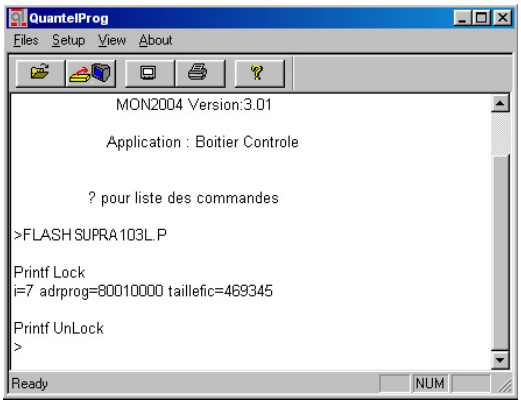


When the control box disappears, the software is loaded.

Switch off the laser.

The procedure is completed.

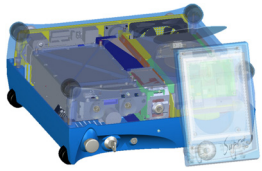
Unplug the serial cable.



The laser software version is displayed on home page next to the SUPRA logo, so that you can ensure that the installation has normally proceeded.

IMPORTANT

HOWEVER
YOU HAVE TO CHECK THE CALIBRATION BEFORE ANY USE OF THE LASER.



11-4 INSTALLATION CHECKING AND SETTINGS

11-4-1 TOUCH SCREEN CALIBRATION

After a software installation, it could be necessary to calibrate the screen.
Perform the touch screen calibration like indicated in chapter 6-1.

11-4-2 LASER SETTINGS

Check and replace if necessary the settings in the following chronological way:

1- CAVITY COMPONENT TEMPERATURES (See section

2- CAVITY CALIBRATION (See section

3- TERMINAL CALIBRATION (See section

4- AIMING BEAM CALIBRATION (See section

Check, with a milli-wattmeter and a 200µ optic fiber , that the max power of aiming beam is around 800µW

When the procedure is completed, press ESC to memorize the settings.

Turn the key to off to reinitialize the securities.

11-4-3 FINAL CONTROL

In doctor mode, measure the terminal output energy at different values of the power range available (low part, middle part and high part with low and high exposure time).

Check that the reading values are inside a tolerance of ± 10% with the requested values.

12

SERVICE CARDS

PLEASE FAX TO QUANTEL MEDICAL, THIS SERVICE CARD IF PROBLEM OCCURS.

DISTRIBUTOR NAME: DATE:

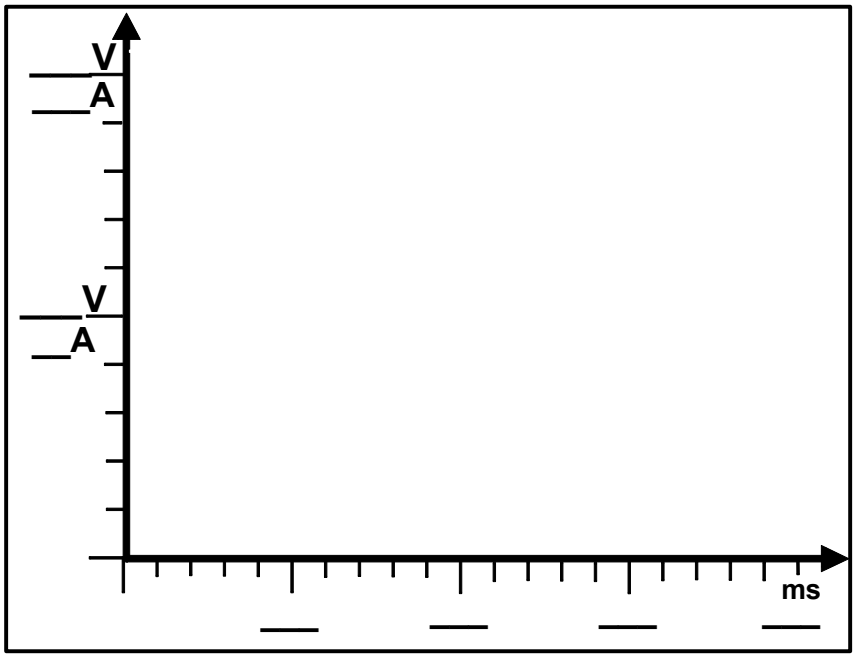
LASER: SERIAL NUMBER:

DEFECT MESSAGE:

Error message area 1	Error message area 2	SAV message area

A) CURVES WHEN A DEFECT OCCURS

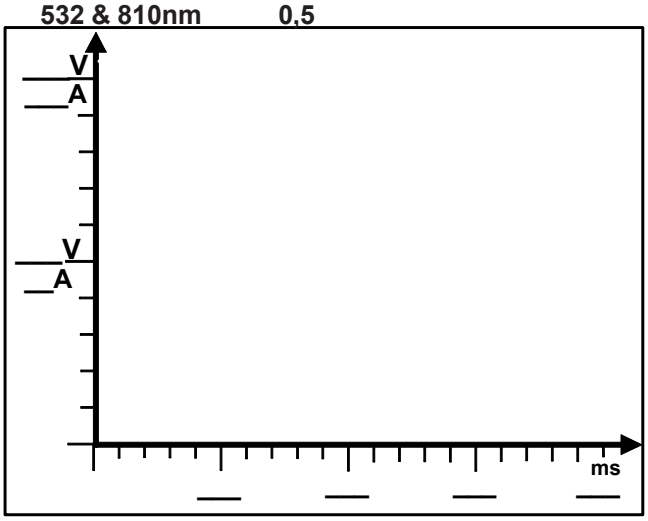
Power level before defect: W



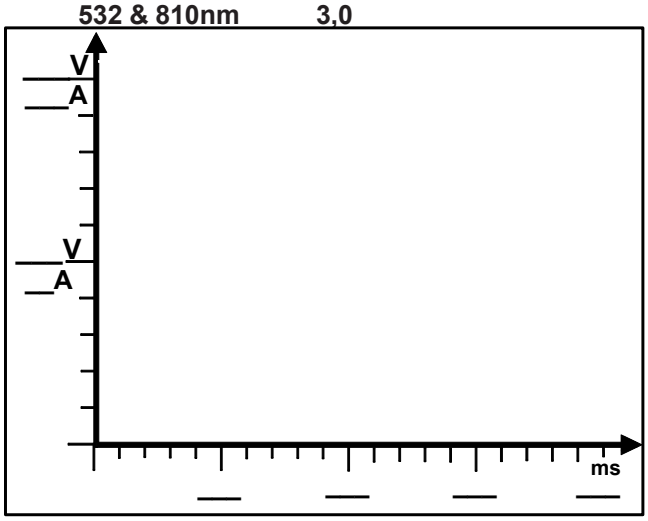
B) CURVES DRAWING FOR SEVERAL DISPLAYED POWERS

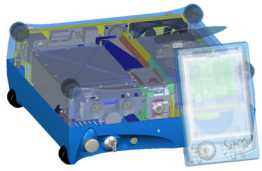
- Shoot once at the indicated power level.

660nm	**0,2**
577nm	**0,5 W - 0,7 s**
532 & 810nm	**0,5**



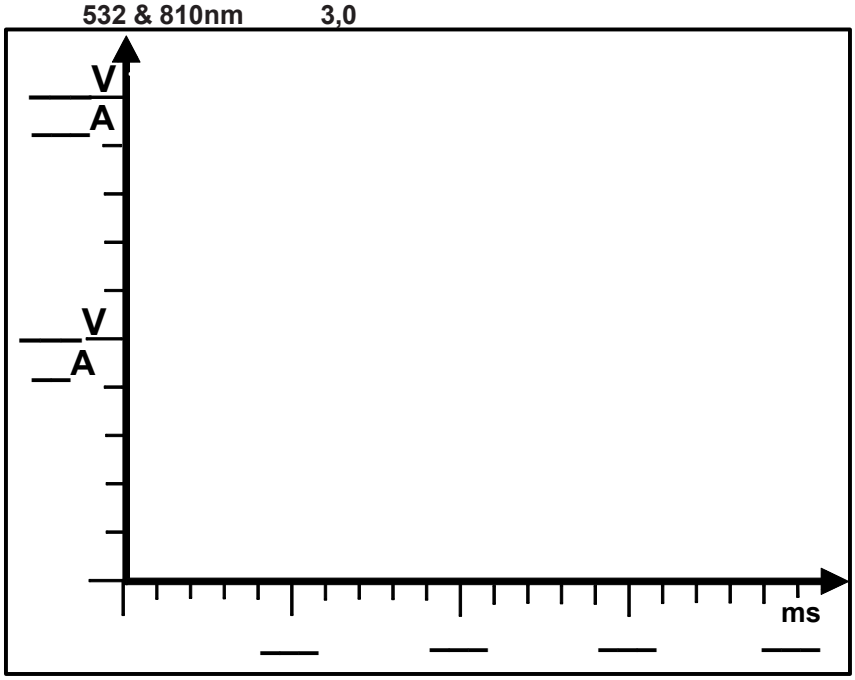
660nm	**0,7**
577nm	**2,0 W - 0,3 s**
532 & 810nm	**3,0**



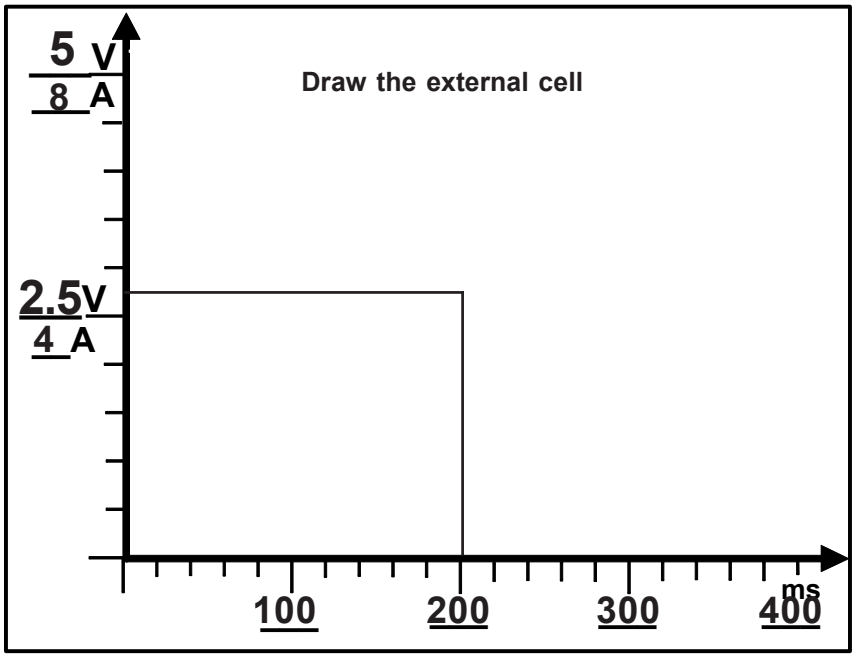


PLEASE FAX TO QUANTEL MEDICAL, THIS SERVICE CARD IF PROBLEM OCCURS.

660nm	0,7
577nm	2,0 W - 0,1 s
532 & 810nm	3,0

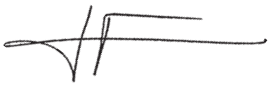


- Set the power at the maximum level to get the flatest internal cell curve as possible (exp. time : 0,2s).



- Press the Statistic button on the first screen page and note the indicated values.

VALIDATION SHEET

Software Version	**SUPRA 3.XX** **SUPRA TWIN 3.XX** **SUPRA T810 1.XX** **SUPRA 577·Y 1.XX**
Publishing Date	**June 2010**
Revision Date	**June 18th 2010**
Written by : **F. LOYAL**	
Checked by : **C. CHABRIER**	
Validated by : **P. QUERO**	